CAPE FEAR TECHNICAL INSTITUTE

CATALOGUE
1969 - 1970
1970 - 1971

State Board of Education
Raleigh, North Carolina

To Whomsoever These Presents May Come
Greetings: Know Ye That

Cape Fear Technical Institute

Is Chartered

By authority of the General Assembly of the State of North Carolina under the terms and provisions of Article 115-A of the General Statutes of said State as a public institution of the North Carolina Community College System having been Originally established on the 3rd day of April, in the year of 1958 as a tax supported institution under the style and title of

Wilmington Industrial Education Center.

In Witness Whereof and Certification Thereto, we the undersigned have subscribed our names this 4th day of June, Anno Domini 1964.

DIRECTOR
DEPARTMENT OF COMMUNITY COLLEGES

CHAIRMAN
STATE BOARD OF EDUCATION OF NORTH CAROLINA

CAPE FEAR TECHNICAL INSTITUTE

411 NORTH FRONT STREET
WILMINGTON, N. C. 28401
PHONE 919-763-9876

Catalogue of Information

1969-70 — 1970-71

General Information ..... White

Technical Division ..... Green

Trade Division ..... Yellow

Extension & General Adult Division ..... Blue

Volume IV September 1969

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Foreword

The Cape Fear Technical Institute was founded as an area school to meet the occupational training needs of the people of Southeastern North Carolina and of the growing industrial community.

Every effort has been made to provide the equipment, facilities and skilled teachers necessary to allow maximum opportunities for the people to develop new skills, up-date old skills, and further their knowledge to enhance their value to industry and promote their own personal growth.

North Carolina has the most valuable of all resources, a vast reservoir of good people who make fine citizens and excellent employees. Therefore, Cape Fear Technical Institute pledges itself to continue to do all in its power to provide the educational opportunities needed by people to meet the challenging needs of modern industry and help them grow in their understanding and enjoyment of life.

M. J. McLEOD
President

Note

The Cape Fear Technical Institute issues this catalogue for the purpose of furnishing prospective students and other interested persons with information about the institution and its programs. Announcements contained herein are subject to change without notice and may not be regarded in the nature of binding obligations on the Institute or the State. Efforts will be made to keep changes to a minimum, but changes in policy by the State Board of Education, the Department of Community Colleges, or by local conditions may make some alterations in curriculums, fees, etc. necessary.

Visitors

Visitors, and in particular prospective students, are always welcome at Cape Fear Technical Institute. The student personnel office will provide guide service for groups or individuals on week days between 8:00 a.m. and 5:00 p.m. The school is open until 10 p.m. and individuals may visit at their convenience. Questions about the school and its programs will be answered by someone from the student personnel office.

Statement of Policy

The contact hours shown in the catalogue are minimal. It is a policy of this institution to permit students to enroll in additional subjects and laboratory work beyond those shown in the catalogue.

When in any quarter the total weekly contact hours listed are fewer than twenty-five hours in a technical curriculum and fewer than thirty hours in a vocational trade curriculum, a student may enroll on request for additional instructional hours deemed by the institution to be consistent with the program and appropriate to the student to make up twenty-five hours per week in a technical curriculum or sufficient hours of attendance to make up thirty hours per week in a vocational trade curriculum.

Institutional Memberships

An Institutional Member of the American Association of Junior Colleges.

An Institutional Member of the American Technical Society.

An Institution of the North Carolina Department of Community Colleges.

GENERAL INFORMATION

CAPE FEAR TECHNICAL INSTITUTE
SCHOOL CALENDAR
1969-1970

FALL QUARTER

Freshman Registration & Orientation	September 8, 1969
Second Year Students Registration	September 9, 1969
Classes Begin for All Students	September 10, 1969
Classes End	November 25, 1969

Thanksgiving Holidays between Quarters

WINTER QUARTER

Pre-registration	November 24 & 25, 1969
Registration	December 1, 1969
Classes Begin	December 2, 1969
Classes End	March 2, 1970

Christmas Holidays December 22 through January 4, 1970

SPRING QUARTER (1970)

Pre-registration	Feb. 27 & March 2, 1970
Registration	March 9, 1970
Classes Begin	March 10, 1970
Classes End	May 28, 1970

Easter Holidays March 26 through 30, 1970

SUMMER QUARTER

Pre-registration	May 27 & 28, 1970
Registration	June 1, 1970
Classes Begin	June 2, 1970
Classes End	August 18, 1970

Holiday July 6, 1970

CAPE FEAR TECHNICAL INSTITUTE
SCHOOL CALENDAR
1970-1971

FALL QUARTER

Freshman Registration & Orientation	September 8, 1970
Second Year Students Registration	September 9, 1970
Classes Begin for All Students	September 10, 1970
Classes End	November 25, 1970

Thanksgiving Holidays between Quarters

WINTER QUARTER

Pre-registration	November 24 & 25, 1970
Registration	November 30, 1970
Classes Begin	December 1, 1970
Classes End	February 25, 1971

Christmas Holidays December 23, 1970 through January 3, 1971

SPRING QUARTER (1971)

Pre-registration	February 24, 25, 1971
Registration	March 2, 1971
Classes Begin	March 3, 1971
Classes End	May 21, 1971

Easter Holidays April 8 through 12, 1971

SUMMER QUARTER

Pre-registration	May 20, 21, 1971
Registration	June 1, 1971
Classes Begin	June 2, 1971
Classes End	August 18, 1971

Holiday, July 5, 1971

STATE ADMINISTRATION

I. E. Ready — Director, Department of Community Colleges

STATE BOARD OF EDUCATION

W. Dallas Herring — Rose Hill, N. C., Chairman
J. A. Prichett — Windsor, N. C., Vice-Chairman
Charles S. Jordan — Durham, N. C.
Mrs. Eldiweiss F. Lockey — Aberdeen, N. C.
William R. Lybrook — Winston-Salem, N. C.
George Douglas Aitken — Charlotte, N. C.
R. Barton Hayes — Hudson, N. C.
John M. Reynolds — Asheville, N. C.
Mrs. W. B. Strickland — Smithfield, N. C.
Harold L. Trigg — Greensboro, N. C.
Dr. A. Craig Phillips — Supt. of Public Instruction, Raleigh, N. C.
Lt. Governor H. P. Taylor, Jr. — Raleigh, N. C.
State Treasurer Edwin Gill — Raleigh, N. C.

LOCAL BOARD OF TRUSTEES

Fred J. Galehouse, Chairman, 110 Green Forest Drive, Wilmington
William Emmart, Vice-Chairman, First-Citizens Bank & Trust Co., 8 N. Front Street, Wilmington
R. L. Burnett, New Hanover Memorial Hospital, Wilmington
L. M. Cromartie, 420 W. Shipyard Bldv., Wilmington
C. McD. Davis, Porters Neck Plantation, Route 1, Box 307-FB, Wilmington
Hubert A. Eaton, 411 N. Seventh Street, Wilmington
Howard Holly, Burgaw, N. C.
Alfred A. Johnston, 2743 Mimosa Place, Wilmington
Eugene McWatty, S & G Concrete, 2812 Monroe Street, Wilmington
W. Mercer Rowe, Cooperative Savings & Loan Association, 201 Market Street, Wilmington
Kirby Sullivan, 106 E. Moore Street, Southport, N. C .
Frederick Willetts, Jr., Cooperative Savings & Loan Association, 201 Market St., Wilmington

OFFICERS OF ADMINISTRATION

M. J. McLeod — President
Clarence E. Dodgens — Dean of Instruction
Ralph Bordeaux — Director of Evening Programs
E. T. Satterfield, Jr. — Director of Student Personnel
Matthew C. Donahue — Director of Technical and Vocational Programs
John R. Kennedy — Director of General Adult Education
Kenneth D. Futch — Director of Occupational Extension
S. C. Coleman — Business Manager
Elizabeth P. Carroll — Accountant
Robert D. Bass — Registrar
Carl E. Malpass — Counselor
Charles F. Hunnicutt — Counselor
Roger A. Greenleaf — Night Registrar

AREA COORDINATORS

W. K. Dorsey — Tourist Training
John B. Willis — Fishing Trades

LIBRARIANS

Miss Jane Chen — Head Librarian
Miss Emily Potter — Librarian

LEARNING LABORATORY

Charles W. Morton	Coordinator
Charlotte Dexter	Coordinator
Mary N. Corbett	Part-time Coordinator

FACULTY

Blanche W. Ambrose	Head, Nursing Education
Roger H. Averette	Head, Science Department
Emily W. Barefoot	Business Education
William G. Barker	Head, Academic Related
Mary P. Bass	Nursing Education
Chauncey W. Batts	Head, Drafting Department
John J. Braswell	Head, Radio & T.V. Program
Dale R. Buck	Oceanographer
William H. Coleman	Head, Instrumentation Program
Owen S. Eckhardt	Head, Chemical Tech Program
James H. Faison	Related Subjects
Frank E. Finnan	Marine Engineer
Edward L. Foss	Oceanographer
John R. Gallagher	Second Mate Advance II
John P. Harmon	English
James N. Hauser	Drafting
Grag Horton	Head, Air Conditioning Program
Richard James	Navigation
Arthur W. Jordan	Coordinator of Marine Technology and Captain of SS Advance II
Thomas C. Jordan	First Engineer SS Advance II
Philip Jorgensen	Related Subjects
Francis B. Klimek	Head, Mechanics Program
Charles R. Lord	First Mate SS Advance II
William A. Mangum	Mathematics
Lawrence L. Marteney	Related Subjects
James R. Martin	Biologist
Joseph A. Motley	English
John R. Naples	Head, Electronics Program
James R. Nunn	Head, Machine Trades
Samuel T. Rhodes	Biologist
David C. Seeger	Related Subjects
Robert W. Sessoms	Head, Business Education Department
Bobby I. Snapp	Business Education
Leslie S. Stanton	Fishing Trades
Arthur W. Stroman III	Electronic & Related
Roland E. Tyndall	Business Education
James L. Watters	Head, Welding Program
Geraldine J. West	Business Education
Robert H. Williams	Chief Engineer SS Advance II

THE SCHOOL

HISTORY

The Cape Fear Technical Institute was established as the Wilmington Industrial Education Center in 1959 and was raised to the technical institute status on July 1, 1964. It is one of more than fifty such institutions operated by the State under the direction of the Department of Community Colleges in Raleigh, and is administered by a local Board of Trustees. Authority for the establishment and operation of these institutions is found in Chapter 115 A of the General Statutes of North Carolina and the amendments thereto.

PURPOSE

Cape Fear Technical Institute is comprehensive in its purpose and in its plan to meet the needs of the adult population within the community it serves. The Institute provides flexible programs designed to meet these adult educational needs through:

(1) A continuing concern for the total welfare of each student including his physical and mental health, development of capacities and talents, establishment of relationships with other persons, and motivation for progress in intellectual understanding.
(2) Various vocational-technical and trade programs which will prepare a student for employment in a specialized field.
(3) Courses and programs for the adult student who wishes to further his education at the elementary and secondary level, or for an adult who wishes to improve his economic, social, or cultural needs.
(4) Programs to serve new and existing industries by training new employees and upgrading others.
(5) Programs to serve the community by training employees for public services.
(6) Continuous curriculum study and revision of existing programs to meet the needs of the community.

Finally, the Institute strives to live up to the "open door" admissions policy established by the North Carolina Department of Community Colleges. The Institute is concerned with the student's willingness to do, and with providing entry programs at all capability levels. The Institute encourages the student to develop abilities and attitudes which will make him feel that he is a participating, worthwhile, dignified member of his community.

LOCATION

The Cape Fear Technical Institute is conveniently located in the heart of Wilmington on North Front Street. The campus extends

from Front Street to the deep water channel of the Cape Fear River, and is bordered by Red Cross Street on the North and Walnut Street on the South. Some parking space is available on the campus, public transportation is nearby, and hotels, motels, restaurants, theaters, and shops are all within easy walking distance.

The four-story building houses the administrative offices, library, laboratories, classrooms, student lounge, and part of the shop areas. An additional shop building is located at the water's edge, and a pier extends out to the deep-water channel to provide mooring for the 185-foot school ship, The SS Advance II. The buildings are of all-masonry construction, and designed especially for trade and technical programs. All classrooms and offices are air-conditioned for year-around comfort.

The Wilmington area has abundant recreational facilities, excellent beaches, salt- and fresh-water fishing, good hunting areas; year-round golf courses and tennis courts are all located within a few minutes driving range.

SHOPS & EQUIPMENT

The shops and laboratory areas were carefully planned to provide large, well-ventilated, and industrial-type training facilities.

Equipment for all shops, laboratories, test areas, drafting rooms, and for the training ship was selected to conform with the current tools and devices of industry. Students will find that ample opportunity is provided in all trade and technical curricula for skill-building practice in using modern, industrial, production and testing tools and machines. Specially planned and equipped classrooms are conveniently located for study of the academic related subjects, and a well-stocked technical library is available both day and night for use by faculty, students and area residents.

QUARTER SYSTEM

The school year is divided into four quarters of 55 school days. Credits earned are in quarter hours. See course descriptive section for number of credits required for graduation in each program.

AREAS OF STUDY

Technical Curriculums:

See technical section (Green) of catalogue for descriptions.

Business Administration
Chemical Technology
Drafting & Design
Electronics Technology
Instrumentation Technology

Marine Technology
Marine Laboratory Technology
Secretarial-Engineering and Technical

Persons graduating from these technical curriculums are awarded the Associate in Applied Science Degree.

Vocational Curriculums:

See trade section (Yellow) of catalogue for descriptions.

Automotive Mechanics
Drafting, Mechanical
Heating, Refrigeration & Air-Conditioning
Machinist
Marine Diesel Mechanics
Operating Room Technicians—This course offered periodically
Practical Nurse Education
Radio and Television Servicing
Welding

A diploma is earned by graduates of these vocational programs.

ENTRANCE REQUIREMENTS

All correspondence concerning admissions should be addressed to The Director of Admissions.

ADMISSION OF NEW STUDENTS—The Cape Fear Technical Institute follows the "Open Door" policy established by the State Board of Education. This policy provides for the admission of any North Carolina citizen who has reached the age of 18, or whose high school class has graduated. This policy is based on the belief that the school has something to offer at all educational levels and that through effective guidance a person can find his or her place in the proper educational program.

While a high school education or its equivalent*, is desirable for admission to the full-time training programs, some exceptions are made for individuals whose age and maturity make success in a program likely.

See individual course description in this catalogue for specific admission requirements, prerequisites, etc., for each course.

ADMISSION CRITERIA

1. **Previous Education**—Each applicant shall request his or her high school to submit a transcript showing graduation. Those who are high school seniors should have their school submit a transcript showing work through the first semester of the senior year as soon as possible after the semester has ended, and a supplementary transcript showing graduation at the close of school.

*See page 122 in General Adult Education Section for details about the high school equivalency certificate.

Applicants who have the high school equivalency certificate* should submit a copy of the certificate, but should also ask their high school to send transcript of all work done at the school.

Transcripts of previous education in colleges, technical institutes, etc., should also be submitted to the school. All transcripts must come directly from the school to the Technical Institute and not from the applicants themselves.

2. **Scores on Test Battery**—Students are required to take admission test/s prior to entrance. Qualified counselors at the school use the test results in helping individuals decide which course of study to follow. There is no charge for the test, nor for the counseling service.

3. **Personal Interview**—The personal interview is beneficial to both the applicant and to school officials in that it affords an opportunity to "get acquainted." The applicant has an opportunity to ask questions about the school and its programs while school officials make an effort to evaluate the applicant's interest in, and capability to pursue the program of study applied for.

4. **Physical Examination**—Have doctor mail physical examination form to the Institute.

ADMISSION OF OUT-OF-STATE STUDENTS—Out-of-state students are admitted under the same regulations as others. Tuition and fees are established by the State Board of Education. The most recent ruling places these charges at two and one-half times the amount charged North Carolina students.

1. A person twenty-one years of age or older is not deemed eligible for the lower tuition rate unless he has maintained his legal residence in North Carolina for at least the six months next preceding the date of his first enrollment in an institution of higher education in this State.

2. The legal residence of a person under twenty-one years of age at the time of his first enrollment in an institution of higher education in this State is that of his parents, surviving parent, or legal guardian. In cases where parents are divorced or legally separated, the legal residence of the father will control unless custody of the minor has been awarded by court order to the mother or to a legal guardian other than a parent. No claim of residence in North Carolina based upon residence of a guardian in North Carolina will be considered if either parent is still living unless the action of the court appointing the guardian antedates the student's first enrollment in a North Carolina institution of higher education by at least twelve months.

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*See page 122 in General Adult Education Section for details about the high school equivalency certificate.

3. The residence status of any student is determined as of the time of his first enrollment in an institution of higher education in North Carolina and may not thereafter be changed except: (a) in the case of a nonresident minor student at the time of his first enrollment whose parents have subsequently established legal residence in North Carolina; and (b) in the case of a resident who abandons his legal residence in North Carolina. In either case, the appropriate tuition rate will become effective at the beginning of the quarter or term next following the date of change of residence status.

4. The legal residence of a wife follows that of her husband, except that a women student currently enrolled in this institution as a resident may continue as a resident even though she may marry a nonresident.

5. Military personnel attached to military posts or reservations in North Carolina are not considered eligible for the lower tuition rate unless they have maintained a legal residence in the state for at least the six months next preceding the date of first enrollment in an institution of higher education in the State.

6. Aliens lawfully admitted to the United States for permanent residence who have established a legal residence in North Carolina according to paragraphs numbered 1, 2, or 4, above, are eligible for the lower tuition rate.

7. Ownership of property in or payment of taxes to the State of North Carolina apart from legal residence will not qualify one for the lower tuition rate.

The furnishing of incomplete or incorrect information regarding residence may result in the student's dismissal from the Institute. The Registration Office determines each student's residence status on the basis of existing information and interpretation of regulations.

ADMISSION OF TRANSFER STUDENTS—The Director of Student Personnel along with the Dean and Department heads will review applications for admission with advanced standing. Where subject content and length of course are comparable with those in the curriculum applied for, credit may be allowed for grades of "C" or above. Transfer credits will not influence the students grade point average while at Cape Fear Technical Institute. In certain cases where the school and the student believe an alternate course would be more beneficial to the student, such alternate course may be allowed.

ADMISSION OF FORMER STUDENTS—All former students who left the school in good standing are encouraged to enroll for additional study at the Institute.

REGISTRATION—Students who have been admitted, and who have paid their admission deposit (see page — for information on this deposit) will register on the dates set by the school for this purpose. Students will obtain their class schedules, pay their fees and purchase their books. Late registrants are charged a $5.00 late registration fee.

HOUSING—The Institute does not having housing facilities, but students have had no difficulty in locating satisfactory housing quarters. Some places provide room and board at moderate rates. School officials will assist students in finding housing but cannot assume responsibility beyond this. Students and landlords should have a complete understanding with regard to rental conditions, so that there will be no misunderstanding concerning such details.

HOW MUCH DOES IT COST?—All fees are established by the State Board of Education. Currently tuition is charged at the following rates for all curriculum courses:

North Carolina Students:

Full time	$32.00 per quarter
Part time	$2.50 per quarter hour credit

Out-of-State Students:

Full time	$80.00 per quarter
Part time	$6.25 per quarter hour credit

Books and small tools are purchased by students as they are needed. Books cost on the average approximately $80.00 per year. Costs of tools vary with the course of study, but do not ordinarily exceed $20.00 for a year. A $10.00 activity fee is charged for the year.

All students who work in laboratories or shops are required to purchase accident insurance; this insurance presently costs $2.75 per year.

WHEN ARE PAYMENTS MADE?

When an applicant is officially admitted to a course of study, he is required to make a $15.00 tuition deposit. This deposit is nonrefundable except in cases where the school is unable to admit the person or unable to offer the course applied for.

All tuition charges shall be paid in full on registration day, however in hardship cases, monthly payments may be permitted. Any exceptions to rules on financial affairs must be approved by the Student Personnel Office.

The accident insurance is purchased on registration day of the first quarter of attendance.

No student will be permitted to graduate, or will a transcript be issued until all financial obligations to the school are satisfied.

REFUND

Tuition refund for students shall not be made unless the student is, in the judgment of the institution, compelled to withdraw for unavoidable reasons. In such cases, two-thirds (2/3) of the student's tuition may be refunded if the student withdraws within ten (10) calendar days after the first day of classes as published in the school calendar. Tuition refunds will not be considered after that time. (Tuition refunds will not be considered for tuitions of five dollars ($5.00) or less, except if a course or curriculum fails to materialize, all the students' tuition shall be refunded.)

Where a student, having paid the required tuition and fees for a quarter, withdraws from the institution before the end of the quarter and the reasons for the withdrawal are found excusable by the institution's administration, the student may be allowed credit for unrefunded tuition and fees if he applies for re-admission during any of the next four calendar quarters and petitions in writing to be allowed such credit.

Veterans or war orphans receiving benefits under U.S. Code, Title 38, Chapters 33 and 35, can be refunded the pro rata portion of the tuition fee not used up at the time of withdrawal of such students.

IS STUDENT FINANCIAL AID AVAILABLE?

Limited financial aid is available through gifts or loan funds provided by individuals or civic groups. This program is administered through the services of a Financial Aid Officer located in the Student Personnel Division.

The financial aid program is as follows:

1. **New Hanover Medical Society Loan Fund.**

This is a revolving loan fund established by the Medical Society for students in the practical nurse training program.

2. **East Wilmington Rotary Club Loan Fund.**

Loans are made to students recommended by the school. No interest is charged while the student is in school.

3. **Wilmington Jaycee's Scholarship Fund.**

The Jaycees have made available scholarships to be used for paying tuition. The extent of these scholarships are determined by the amount of funds available.

4. **Vocational Rehabilitation.**

Vocational Rehabilitation is a program operated through the Division of Vocational Rehabilitation in cooperation with the North Carolina Department of Public Instruction and the Federal Office of the Vocational Rehabilitation Administration. The Division is

financed by State and Federal funds. Vocational Rehabilitation offers such services as are necessary to enable a physically or mentally employment-handicapped person to become self-supporting. Financial assistance is available for training at the Cape Fear Technical Institute for eligible handicapped persons.

If a prospective student has a physical disability or is limited in his activity because of a disability he should contact the Division of Vocational Rehabilitation office nearest him. The Division Office for Southeastern North Carolina is located in the Murchison Building in downtown Wilmington.

5. "G. I. BILL" The Veterans Readjustment Benefits Act of 1966.

Most programs being offered by the Institute at this time are approved for training under the so-called "Cold War G.I. Bill." Veterans desiring to train under the benefits of this bill must first establish their eligibility with the Veterans Administration. In general, Veterans who served in the Armed Forces since January 31, 1955, and who were discharged under conditions other than dishonorable, qualify for training under the bill. The amount of training permitted is determined by the number of months of service. Certain servicemen on active duty are also eligible for schooling under this bill. Interested servicemen should contact their Education Officer.

Veterans are admitted under the same admission requirements as other students. They pay tuition and attend school under the same regulations as others. The only difference between Veterans and other students is that they are paid monthly by the Veterans Administration, an amount determined by the hours attended and the number of dependents he has.

To be classified as a full-time student, a Veteran must attend 25 hours per week in a technical course or 30 hours per week in a trade program.

Full details on Veterans training programs may be obtained from any Veterans Service Office. The Veterans Service Office for New Hanover County is located in the Murchison Building in downtown Wilmington, for Pender County in the Courthouse Building in Burgaw, and for Brunswick County at the Police Station in Southport or the Health Center in Shallotte.

6. National Defense Student Loan & Educational Opportunity Grant.

When funds are available the school participates in the National Defense Student Loan and the Educational Opportunity Grant Program. This program is administered by the Financial aid officer located in the Student Personnel section.

FEDERAL PROGRAMS

The Technical Institute cooperates with various federal agencies which provide financial assistance to occupational education trainees. Full information about such programs, when they are available, may be obtained from the Student Personnel section of the Institute.

THE LIBRARY

The Cape Fear Technical Institute Library is located on the second floor of the main building and contains approximately 8,000 volumes, most of which are related to the trade and technical programs offered by the school. The faculty and students are encouraged to make use of this valuable facility.

While the library books are used primarily by students in the Institute, residents of the area served by the school and particularly industrial employees are urged to make use of them.

COUNSELING SERVICES

Qualified counselors are available to assist students in selecting an appropriate course of study, to provide occupational and educational information and to discuss scholastic or personal problems which may arise.

GRADE POINT AVERAGES AND GRADING

Letter grades are used at Cape Fear Technical Institute in reporting grades to students; however, such terms as 3.2, 2.6, and 1.89 will be used. These are called "grade point averages." They are very important. They are earned on the following basis:

GRADE	Numerical Equivalency	Significance	Quality Points Grade—Point
A	94-100	Superior	4
B	86-93	Good	3
C	78-85	Average	2
D	70-77	Poor	1
E	Below 70	Failure	0
I	Incomplete	Incomplete	0
WP		Withdrawal	0
WF		Withdrawal Failing	0

What is a "Quarter Hour?"

Each course listed is followed by a notation on the number of quarter hours it carries. Normally, the number of quarter hours earned is based on the number of class hours spent under the supervisor or the course instructor per week for the quarter.

How are Grade-point averages computed?

For example, suppose grades for the Quarter are:

Subject	Grade	Qtr. Hours Credit
T ENG 102	94 or A	3
T MAT 102	87 or B	5
T BUS 120	76 or D	4
T ECO 104	83 or C	3
T BUS 115	78 or C	3
		18

The grade for each subject will be converted to a grade-point (see conversion in table above). Then the grade-point is multiplied by the quarter hour. The results (Total quality points) is then divided by the total quarter hours credit to give the grade-point average. Example:

Class	Grade Point		Qtr. Hours Credit		Quality Points
T ENG 102	4	×	3	=	12
T MAT 102	3	×	5	=	15
T BUS 120	1	×	4	=	4
T ECO 104	2	×	3	=	6
T BUS 115	2	×	3	=	6
	TOTALS		18		43

Divide $43 \div 18 = 2.39$

Your grade point average is 2.39.

CONDUCT

Students will have but one conduct rule, i.e., to conduct themselves as ladies and gentlemen. This has reference to dress, speech and action. Area or classroom rules will be designated by instructors or supervisors and must be followed by all.

ATTENDANCE AND TARDINESS

Attendance:

1. The nature of the programs for students at CFTI is such that it is necessary that students be in regular attendance at all times.
2. Emergency Absences—A student may be absent from a class for emergency reasons one time for each quarter hour credit given

for the course without affecting his grade. He will be responsible for making up any class assignments missed due to absence from class.

3. A student who accumulates more class absences than quarter hours credit for a course for the following emergency reasons must have their case reviewed by the Director of Student Personnel and Faculty Committee in order to be reinstated.

a. Illness or injury to the student.
b. Illness or death in the immediate family.
c. Inclement weather (hurricane, ice, etc.).

Tardiness:

1. A student is tardy if not in his classroom, lab, or shop when the tardy bell rings.

2. If a student accumulates three tardies in a class the instructor may count these tardies as one of the emergency absences.

3. A student who is fifteen or more minutes late for a class, or who leaves before the class is over without the instructor's permission, will be counted as having an emergency absence from that class.

4. Students will be informed as to the times allotted for breaks between class or lab at the beginning of the quarter; this time limit should be strictly followed to avert penalty.

SPECIAL DRESS

Where special dress or safety devices are required by the Instructor, Director of Student Personnel, or the President, students will be expected to conform.

PROBATION AND SUSPENSION

The probation and suspension policy is designed to give the student every possible opportunity to be successful in his or her training program.

Sub-minimum work in any quarter will result in probationary attendance in the next quarter—sub-minimum work in two consecutive quarters may be cause for suspension or transfer to a more appropriate course of study.

Any student whose conduct becomes unsatisfactory will be placed on probation—any misconduct after a person is placed on probation will result in prompt suspension.

Absences of five or more consecutive days without notification to the Student Personnel Office will result in the student being dropped from the class roll. The student may be readmitted only through the Student Personnel Office.

RIGHT OF APPEAL

Any student who is dismissed from school for academic or disciplinary reasons may have his case reviewed by requesting such through the Director of Student Personnel who in turn will bring his case before the admissions committee.

WITHDRAWAL

Students desiring to withdraw from school should contact the office of Student Personnel Services to obtain the necessary forms and procedures for official withdrawal. A student who fails to withdraw officially will receive a grade of "E" for each course in which enrolled.

In cases where former students desire to re-enter the school they must contact the Director of Student Personnel who will review their records and present their application to the admissions committee for approval.

PLACEMENT

The director of student personnel and staff at Cape Fear Technical Institute make every possible effort to assist students and graduates in securing positions in their chosen fields. Although the director and staff cannot guarantee placement, they keep in touch with business and industry concerning employment opportunities for students at Cape Fear Technical Institute.

There is no charge to industry or students for this placement service.

NON-IMMIGRANT ALIEN STUDENTS

"This school is authorized under Federal law to enroll non-immigrant alien students."

DRAFT STATUS

It is the responsibility of a male student to apply for his own student deferment classification. He does this by completing Form SS 109 which may be obtained from the Registrar's office.

TECHNICAL DIVISION

TECHNICAL DIVISION

Technicians are among the fastest growing occupational groups in the United States. In recent years, the needs of an expanding and increasingly-technical economy have greatly intensified the demand not only for engineers and scientists, but also for the technical workers who assist them. Technicians are those workers whose jobs require both knowledge and use of scientific and mathematical theory; specialized education or training in some aspect of technology or science; and who, as a rule, work directly with scientists and engineers. Some jobs held by these technicians are supervisory and require both technical knowledge and the ability to supervise people.

In carrying out their assignments, engineering and science technicians frequently use complex electronic and mechanical instruments, experimental laboratory apparatus, and drafting instruments. These workers engage in virtually every aspect of engineering and scientific work. In research, development, and design work, they conduct experiments or tests; set up, calibrate, and operate instruments; and make calculations. They also assist scientists and engineers in developing experimental equipment and models by making drawings and sketches and frequently do some design work.

Technicians also work in jobs related to production and may aid in the various phases of production operations, such as working out specifications for materials and methods of manufacture, advising tests to insure quality control of products, or making time-and-motion studies (timing and analyzing the worker's movements) designed to improve the efficiency of a particular operation. They may also perform liaison work between engineering and production or other departments.

The Cape Fear Technical Institute provides training in a number of areas which require training beyond the high school but which do not require four years of college preparation. Most of the technical programs are eighteen months in length and are geared to train a person in specific technical areas. Students spend twenty to thirty hours per week in classroom and laboratory work; additional time will be needed for outside assignments.

Credit hours granted in the various technical programs are not transferable to other institutions except as an institution may determine that a particular course and credits are applicable to a curriculum offered by that school.

The associate in applied science degree is awarded to students who complete a technical program. To be eligible for the degree, a student must maintain satisfactory grades in all laboratory and class subjects. Certificates are given to those who pass less than the whole course of study.

COURSES OFFERED

Business Administration

Chemical Technology

Drafting & Design Technology

Electronics Technology

Instrumentation Technology

Marine Technology

Marine Laboratory Technology

Secretarial-Engineering and Technical

ADMISSION REQUIREMENTS

1. Must be at least eighteen years of age, or his high school class must have graduated.

2. Must be a high school graduate or equivalent*.

3. Must demonstrate aptitude for technician training as determined by standard tests. These tests will aid in student selection, placement, and guidance. Guidance and counseling will be available to the student throughout his education, not just at the time of his enrollment.

4. Must be in acceptable condition of physical and mental health. Medical examination is required prior to the beginning of the first quarter of enrollment.

5. A personal interview is required.

ADMISSION PROCEDURE

1. Submit completed application.

2. Have transcripts of all previous education mailed to the Institute.

3. Satisfy admission test requirement.

4. Come to the school for a personal interview and additional testing when asked to do so.

5. Have doctor mail physical examination form to the Institute.

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*See page 122 in General Adult Education Section of this catalogue for details about the high school equivalency certificate.

BUSINESS ADMINISTRATION

In North Carolina the opportunities in business are increasing. With the increasing population and industrial development in this State, business has become more competitive and automated. Better opportunities in business will be filled by students with specialized education beyond the high school level. The Business Administration Curriculum is designed to prepare the student for employment in one of many occupations common to business. Training is aimed at preparing the student in many phases of administrative work that might be encountered in the average business.

The specific objectives of the Business Administration Curriculum are to develop the following competencies:

1. Understanding of the principles of organization and management in business operations.

2. Understanding our economy through study and analysis of the role of production and marketing.

3. Knowledge in specific elements of accounting, finance, and business law.

4. Understanding and skill in effective communication for business.

5. Knowledge of human relations as they apply to successful business operations in a rapidly expanding economy.

The graduate of the Business Administration Curriculum may enter a variety of career opportunities from beginning sales person or office clerk to manager trainee. The duties and responsibilities of this graduate vary in different firms. These encompassments might include: making up and filing reports, tabulating and posting data in various books, sending out bills, checking calculations, adjusting complaints, operating various office machines, and assisting managers in supervising. Positions are available in businesses such as advertising; banking; credit; finance; retailing; wholesaling; hotel, tourist, and travel industry; insurance; transportation; and communications.

BUSINESS ADMINISTRATION

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
T-ENG 101—Grammar and Composition	3	0	3
T-BUS 102—Typewriting (or Elective)	2	3	3
T-MAT 110—Business Mathematics	5	0	5
T-BUS 101—Introduction to Business	5	0	5
T-ECO 102—Economics	3	0	3
	18	3	19
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-BUS 120—Accounting	5	2	6
T-ECO 104—Economics	3	0	3
T-BUS 103—Typewriting (or Elective)	2	3	3
T-BUS 115—Business Law	3	0	3
	16	5	18
THIRD QUARTER			
T-ENG 204—Oral Communication	3	0	3
T-BUS 123—Business Finance	2	2	3
T-BUS 110—Office Machines	2	2	3
T-BUS 121—Accounting	5	2	6
T-BUS 116—Business Law	3	0	3
	15	6	18
FOURTH QUARTER			
T-ENG 103—Report Writing	3	0	3
T-BUS 124—Business Finance	3	0	3
T-EDP 104—Introduction to Data Processing Systems	3	2	4
T-BUS 122—Accounting	5	2	6
T-PSY 206—Applied Psychology	3	0	3
	17	4	19

FIFTH QUARTER

T-ENG 206—Business Communication	3	0	3
T-BUS 232—Sales Development	2	2	3
T-BUS 243—Advertising	3	2	4
T-BUS 235—Business Management	3	0	3
T-POL 201—U. S. Government	3	0	3
T-BUS 247—Business Insurance	3	0	3
	17	4	19

SIXTH QUARTER

T-BUS 229—Taxes	3	2	4
T-BUS 272—Principles of Supervision	3	0	3
T-BUS 271—Office Management	3	0	3
T-BUS 239—Marketing	5	0	5
T-SSC 206—American Institutions	3	0	3
T-BUS 245—Retailing	3	0	3
	20	2	21

BUSINESS ADMINISTRATION

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

T-Mat 110—Business Mathematics: This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent uses of mathematics in the field of business.
Prerequisite: None

T-Bus 101—Introduction to Business: A survey of the business world with particular attention devoted to the structure of the various types of business organization, methods of financing, internal organization, and management.
Prerequisite: None

T-Eco 102—Economics: The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Bus 120—Accounting: Principles, techniques and tools of accounting, for understanding of the mechanics of accounting. Collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: T-Mat 110

T-Eco 104—Economics: Greater depth in principles of economics, including a penetration into the composition and pricing of national output, distribution of income, international trade and finance, and current economic problems.
Prerequisite: T-Eco 102

T-Bus 103—Typewriting: Instruction emphasizes the development of speed and accuracy with further mastery of correct typewriting techniques. These skills and techniques are applied in tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 102 or the equivalent. Speed requirement, 30 words per minute for five minutes.

T-Bus 115—Business Law: A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, and agencies.
Prerequisite: None

THIRD QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Bus 123—Business Finance: Financing of business units, as individuals, partnerships, corporations, and trusts. A detailed study is made of short-term, long-term, and consumer financing.
Prerequisite: None

T-Bus 110—Office Machines: A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machine, full keyboard adding machines, and calculator.
Prerequisite: None

T-Bus 121—Accounting: Partnership and corporation accounting including a study of payrolls, federal and state taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: T-Bus 120

T-Bus 116—Business Law: Includes the study of laws pertaining to bailments, sales, riskbearing, partnership-corporation, mortgages, and property rights.
Prerequisite: T-Bus 115

FOURTH QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Bus 124—Business Finance: Financing, federal, state, and local governments and the ensuing effects upon the economy. Factors affecting supply of funds, monetary and credit policies.
Prerequisite: T-Bus 123

T-Edp 104—Introduction to Data Processing Systems: Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None

T-Bus 122—Accounting: Advanced practice problems in accounting. Emphasis on detailed and accurate interpretation of data for management.
Prerequisite: T-Bus 121

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

FIFTH QUARTER

T-Eng 206—Business Communication: Develops skills in techniques in writing business communications. Emphasis is placed on writing action — getting sales letters and prospectuses. Business reports, summaries of business conferences, letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry.
Prerequisite: T-Eng 102

T-Bus 232—Sales Development: A study of retail, wholesale and specialty selling. Emphasis is placed upon mastering and applying the fundamentals of selling. Preparation for and execution of sales demonstrations required.
Prerequisite: None

T-Bus 243—Advertising: The role of advertising in a free economy and its place in the media of mass communications. A study of advertising appeals; product and market research; selection of media; means of testing effectiveness of advertising. Theory and practice of writing advertising copy for various media.
Prerequisite: None

T-Bus 235—Business Management: Principles of business management including overview of major functions of management, such as planning, staffing, controlling, directing, and financing. Clarification of the decision-making function versus the operating function. Role of management in business — qualifications and requirements.
Prerequisite: None

T-Pol 201—United States Government: A study of government with emphasis on basic concepts, structure, powers, procedures and problems.
Prerequisite: None

T-Bus 247—Business Insurance: A presentation of the basic principles of risk insurance and their application. A survey of the various types of insurance is included.
Prerequisite: None

SIXTH QUARTER

T-Bus 229—Taxes: Application of federal and state taxes to various busi-

nesses and business conditions. A study of the following taxes: income, payroll, intangible, capital gain, sales and use, excise, and inheritance.
Prerequisite: T-Bus 121

T-Bus 272—Principles of Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None

T-Bus 271—Office Management: Presents the fundamental principles of office management. Emphasis on the role of office management including its functions, office automation, planning, controlling, organizing and actuating office problems.
Prerequisite: None

T-Bus 239—Marketing: A study of the marketing structure within the framework of the U. S. economic system. It includes the study of the movement of goods from producer to consumer through various channels of distribution, the functions of marketing, the social and economic implications.
Prerequisite: None

T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None

T-Bus 245—Retailing: A study of the role of retailing in the economy including development of present retail structure, functions performed, principles governing effective operation and managerial problems resulting from current economic and social trends.
Prerequisite: None

CHEMICAL TECHNOLOGY

The Chemical Technology program is designed to give the student the necessary fundamental knowledge of chemistry and closely related subjects so that the many functions he performs in the laboratory have a definite meaning. He is taught to develop a skill in the use of not only the more sophisticated equipment, but also the common everyday "tools of the trade" equipment. He will be taught patience, yet be quick, but precise.

This is a two-year program. The first year will be spent acquainting the student with the principles of general chemistry. He will get, in addition to chemistry, fundamentals of physics and mathematics that he will need; English, to allow him to express himself and to present his results in the proper manner; and mechanical drafting to assist him to develop manual dexterity and self-expression.

In the second year he will spend most of his time in the laboratory and will learn the principles of Industrial Chemical Analysis which encompasses quantitative and physical chemistry as applied to practical procedures. Organic Chemistry is given to acquaint the student with the basic reactions of this important branch of chemistry and he will perform many practical experiments in this interesting field. He will have a course in Chemical Mathematics and several electives which will complement his fundamental training.

CHEMICAL TECHNOLOGY

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
T-ENG 101—Grammar and Composition	3	0	3
T-MAT 101—Technical Mathematics	5	0	5
T-PHY 101—Physics: Properties of Matter	3	2	4
T-DFT 101—Technical Drafting	0	6	2
T-CHM 111—General Chemistry	4	3	5
	15	11	19
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-MAT 102—Technical Mathematics	5	0	5
T-PHY 102—Physics: Work, Energy, Power	3	2	4
T-DFT 102—Technical Drafting	0	6	2
T-CHM 112—General Chemistry	4	3	5
	15	11	19
THIRD QUARTER			
T-ENG 204—Oral Communication	3	0	3
T-MAT 103—Technical Mathematics	5	0	5
T-PHY 103—Physics: Electricity	3	2	4
T-CHM 121—Qualitative Chemical Analysis	2	9	5
T-PSY 206—Applied Psychology	3	0	3
	16	11	20
FOURTH QUARTER			
T-MAT 206—Chemical Mathematics	5	0	5
T-CHM 240—Industrial Chemical Analysis	4	9	7
T-PHY 104—Physics: Light and Sound	3	2	4
T-ISC 201—Industrial Organization & Management	3	0	3
	15	11	19
FIFTH QUARTER			
T-ENG 103—Report Writing	3	0	3
T-CHM 231—Organic Chemistry	3	6	5
T-CHM 241—Industrial Chemical Analysis	2	9	5
T-MEC 209—Introduction to Metallurgy	3	0	3
	11	15	16
SIXTH QUARTER			
T-CHM 232—Organic Chemistry	3	6	5
T-CHM 242—Industrial Chemical Analysis	2	9	5
T-SSC 206—American Institutions	3	0	3
T-EDP 104—Introduction to Data Processing Systems	3	0	3
	11	15	16

CHEMICAL TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic prin-

ciples of English, grammer and written composition in their day to day situations.
Prerequisite: None

T-Mat 101—Technical Mathematics: The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The devisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None

T-Dft 101—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric, oblique, and perspective are introduced.
Prerequisite: None

T-Chm 111—General Chemistry: An introductory chemistry course involving chemical terminology, atomic structure, properties of some elements, and the function of the periodic table. Properties of compounds and mixtures are studied as are types of chemical reactions. Laboratory work consists of various inorganic reactions and preparations.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition—A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102—Technical Mathematics: A continuation of T-Mat 101. Advanced algebraic and trigonometric topics including quadratics, logarithms, determinants, progressions, the binomial expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth.
Prerequisite: T-Mat 101

T-Phy 102—Physics: Work, Energy, Power: Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Mat 101, T-Phy 101

T-Dft 102—Technical Drafting: The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Most important is the introduction of the graphical analysis of space problems. Problems of practical design elements involving points, lines, planes, and a combination of these elements shall be studied. Dimensioning practices, approved by the American Standards Association will also be included. Introduction is given to intersections and developments of various types of geometrical objects.
Prerequisite: T-Dft 101

T-Chm 112—General Chemistry: A study of the properties of elements not covered in T-Chm 101 and a study in greater depth of the combining properties of the elements including equivalent weights. Laboratory work includes chemical reactions and an investigation of properties of solutions.
Prerequisite: T-Chm 111

THIRD QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Mat 103—Technical Mathematics: The fundamental concepts of analytical geometry, differential and integral calculus are introduced. Topics included are graphing techniques, geometric and algebraic interpretation of the derivative, differentials, rate of change, the integral and basic integration techniques. Applications of these concepts to practical situations are stressed.
Prerequisite: T-Mat 102

T-Phy 103—Physics: Electricity: Basic theories of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: T-Mat 101, T-Phy 101

T-Chm 121—Qualitative Chemical Analysis: Emphasis is placed on developing laboratory techniques employed in the volumetric analysis of acids and bases. The students will become thoroughly familiar with the principles and procedures of neutralization titration. Classroom work will emphasize the stoichiometeric calculations involved in interpreting the results of analysis. Laboratory work will consist of percentage analysis of selected substances.
Prerequisite: T-Chem 112

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principle of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

FOURTH QUARTER

T-Mat 206—Chemical Mathematics: Mathematics pertinent to the field of chemistry is covered with pertinent areas of physics also stressed. Some topics included are: Exponents, roots, radicals, logarithms, standard notation, slide rule, metric systems, and dimensional analysis. Signed numbers, special products and factoring, linear equations, quadratics, and numerical trigonometry are introduced from the field of algebra.
Prerequisites: T-Mat 101, 102, 103

T-Chm 240—Industrial Chemical Analysis: This three quarter course has been designed around laboratory procedures of the types used in industrial laboratories. The theoretical aspects of the various procedures are covered in classroom discussion.
The course combines quantitative analysis with physical chemistry to give the student actual experience with modern instrumentation and sufficient theoretical discussion that he understands the principle of the instrument.
Prerequisites: T-Chm 112, T-Chm 121, T-Phy 101, 102 and 103, and T-Mat 101.

T-Phy 104—Physics: Light and Sound: A survey of the concepts involving wave motion leads to a study of sound, its generation, transmission and detection. The principles of wave motion also serve as an introduction to a study of light, illumination and the principles involved in optical instruments. Application is stressed throughout.
Prerequisite: T-Phy 101

T-Isc 201—Industrial Organization and Management: Organizational structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None

FIFTH QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Chm 231—Organic Chemistry: Nomenclature, structure, preparation, properties, and reactions of aliphatic organic compounds. Laboratory work emphasizes techniques.
Prerequisite: T-Chm 112

T-Chm 241—Industrial Chemical Analysis: An industrial laboratory situation is simulated. Principles and techniques learned in previous quarters are utilized in solution of problems common to local industry. It will be the responsibility of the instructor to determine and submit in outline form a program of suitable scope and sequence of topics which he will work out from consultation with his local advisory committee, representing the industry. This program must be approved by the administration and accepted by the appropriate State-level authority.
Prerequisite: T-Chm 240

T-Mec 209—Introduction to Metallurgy: Introductory course in metallurgy. Analysis of the structure of metals and alloys, atomic structure, nuclear structure, and nuclear reactions. Solid (crystalline) structures, methods of designating crystal planes; liquid and vapor phases; phase diagrams; and alloy systems.
Prerequisite: T-Phy 101

SIXTH QUARTER

T-Chm 232—Organic Chemistry: The nomenclature, structure, preparation properties, and reactions of aromatic organic compounds. Laboratory work emphasizes techniques and involves preparation and analysis of selected organic compounds.
Prerequisite: T-Chm 231

T-Chm 242—Industrial Chemical Analysis: An industrial laboratory situation is maintained and the emphasis on instrumentation is expanded. Problems of industrial quality control. Plant visitations.
Prerequisite: T-Chm 241

T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None

T-Edp 104—Introduction to Data Processing Systems: Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None

DRAFTING & DESIGN — MECHANICAL

This curriculum description was prepared for the purpose of outlining a training program for students of mechanical drafting and design technology. There are certain identifiable duties which are common to all technicians of this general classification and which comprise the basic areas of technical knowledge they need. This curriculum has been designed for training persons in the accepted performance of these basic duties that wlil be assigned, and to enable the individual student to become proficient in a short time after he becomes employed in the industry.

Courses in general education have been included to give a student the assurance and understanding that comes with education upon a broad base. The technician associates with many levels of thought and expression — administrative, personnel, scientists, engineers, skilled workmen—and must be able to communicate effectively with all levels. Courses containing essential information from related subject areas, such as mathematics, physics, and mechanics have been included in order to provide the student a better academic base for his training. Emphasis is placed upon ability to think and plan, as well as drafting procedures and techniques.

Mechanical drafting and design technicians are concerned with the preparation of drawings for design proposals, for experimental models and items for production for use.

These technicians perform many aspects of drafting in a specialized field, such as the developing of the drawing of a section, subassembly or major component. Investigating design factors and availability of material and equipment, production methods and facilities are frequent assignments. They assist in the design of units and controls from specifications by utilizing drawings of existing units and reports on functional performance. They may draw components in industrial fields based on engineers' original design concepts or specific ideas. Also, they may be assigned as coordinators for the execution of related work or other design, production, tooling, material and planning groups. Technicians with experience in this classification may often supervise the preparation of working drawings.

These technicians are employed in many types of manufacturing, fabrication, research development and service industries. Substantial numbers also are employed in communications, transportation, public utilities, consulting engineering firms, and federal, state, and local governments.

DRAFTING & DESIGN — MECHANICAL

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
T-ENG 101—Grammar and Composition	3	0	3
T-MAT 101—Technical Mathematics	5	0	5
T-PHY 101—Physics: Properties of Matter	3	2	4
T-DFT 101—Technical Drafting	0	6	2
T-MEC 101—Machine Processes	0	6	2
	11	14	16
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-MAT 102—Technical Mathematics	5	0	5
T-PHY 102—Physics: Work, Energy, Power	3	2	4
T-DFT 102—Technical Drafting	0	6	2
T-MEC 102—Machine Processes	0	6	2
	11	14	16
THIRD QUARTER			
T-ENG 204—Oral Communications	3	0	3
T-MAT 103—Technical Mathematics	5	0	5
T-PHY 103—Physics: Electricity	3	2	4
T-PHY 106—Applied Mechanics	3	3	4
T-DFT 103—Technical Drafting	0	6	2
	14	11	18
FOURTH QUARTER			
T-ENG 103—Report Writing	3	0	3
T-DFT 201—Technical Drafting	2	6	4
T-DFT 204—Descriptive Geometry	2	4	4
T-MEC 205—Strength of Materials	2	0	2
T-MEC 210—Physical Metallurgy	3	3	4
	12	13	17

FIFTH QUARTER

T-DFT 205—Design Drafting I	2	6	4
T-DFT 211—Mechanisms	3	2	4
T-MEC 211—Physical Metallurgy	3	3	4
T-WLD 101—Welding	3	0	3
T-PSY 206—Applied Psychology	3	0	3
	14	11	18

SIXTH QUARTER

T-DFT 206—Design Drafting II	4	9	7
T-PHY 105—Hydraulics & Pneumatics	3	3	4
T-SSC 206—American Institutions	3	0	3
T-BUS 101—Typewriting	3	0	3
	13	12	17

DRAFTING & DESIGN — MECHANICAL

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.

Prerequisite: None

T-Mat 101—Technical Mathematics: The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed.

Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.

Prerequisite: None

T-Dft 101—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand othographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric, oblique, and perspective are introduced.

Prerequisite: None

T-Mec 101—Machine Processes: An introductory course designed to acquaint the student with basic hand tools, safety procedures and machine processes of modern industry. It will include a study of measuring instruments, characteristics of metals and cutting tools. The student will become familiar with the lathe family of machine tools by performing selected operations such as turning, facing, threading, drilling, boring, and reaming.

Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102—Technical Mathematics: A continuation of T-Mat 101. Advanced algebraic and trigonometric topics including quadratics, logarithms, determinants, progressions, the binomial expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth.
Prerequisite: T-Mat 101

T-Phy 102—Physics: Work, Energy, Power: The major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Phy 101, T-Mat 101

T-Dft 102—Technical Drafting: The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Most important is the introduction of the graphical analysis of space problems. Problems of practical design elements involving points, lines, planes, and a combination of these elements shall be studied. Dimensioning practices for "details" and "working drawings," approved by the American Standards Association will also be included. Introduction is given to intersections and developments of various types of geometrical objects.
Prerequisite: T-Dft 101

T-Mec 102—Machine Processes: Advanced operations on lathe, drilling, boring and reaming machines. Milling machine theory and practice. Thorough study of the types of milling machines, cutters, jig and fixture devices, and the accessories used in a modern industrial plant. Safety in the operational shop is stressed.
Prerequisite: T-Mec 101

THIRD QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Mat 103—Technical Mathematics: The fundamental concepts of analytical geometry, differential and integral calculus are introduced. Topics are graphing techniques, geometric and algebraic interpretation of the derivative, differentials, rate of change, the integral and basic integration techniques. Applications of these concepts to practical situations are stressed.
Prerequisite: T-Mat 102

T-Phy 103—Physics: Electricity: Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: T-Phy 101, T-Mat 101

T-Phy 106—Applied Mechanics: Concepts and principles of statics and dynamics. Parallel concurrent and noncurrrent force systems in coplanar and noncoplanar situations. Concepts of centroids and center of gravity, moments of inertia, fundamentals of kinetics, and kinematics of velocity and motion.
Prerequisites: T-Mat 103, T-Phy 102

T-Dft 103—Technical Drafting: Intersection and developments and their practical solutions. Where applicable, model solutions accompany the problems. The various techniques employed to produce and render isometric and oblique drawings, isometric, dimetric and trimetric projections, will be included.
Prerequisite: T-Dft 102

FOURTH QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Dft 201—Technical Drafting: Applications and constructions of charts, graphs, and nomographs in engineering and technical data. Screw threads, springs, keys, rivets, piping, and welding symbols, methods of representing and specifying will be covered. Basic mechanisms of motion transfer, gears and cams, will be studied and drawn with emphasis on methods of specifying, calculating, dimensions, and delineating.
Prerequisite: T-Dft 103

T-Dft 204—Descriptive Geometry: Graphic analysis of space problems involving points, lines, planes, connectors, and a combination of these. Practical design problems will be stressed with analytical verification where applicable. Visualization shall be stressed on every problem.
Prerequisites: T-Dft 102, T-Mat 102

T-Mec 205—Strength of Materials: Study of principles and analysis of stresses which occur within machine and structure elements subjected to various types of loads such as static, impact, varying and dynamic. Analyses of these stresses are made as applied to thin-walled cylinders and spheres, riveted and welded joints, beams, columns and machine components.
Prerequisites: T-Phy 106, T-Mat 103

T-Mec 210—Physical Metallurgy: Introductory course in metallurgy, a basic study of the properties of metals and alloys. Analysis of the structure of metals and alloys, atomic structure, nuclear structure, and nuclear reactions. Solid (crystalline) structures, methods of designating crystal planes; liquid and vapor phases; phase diagrams; and alloy systems.
Prerequisite: T-Phy 101

FIFTH QUARTER

T-Dft 205—Design Drafting I: Basic design is introduced in the study of motion transfer mechanisms as they relate to power trains. Principles of design, sketching, design drawing, layout drafting, detailing from layouts, production drawings and simplified drafting practices constitute areas of study. Types and methods of specifying materials and workmanship are an integral part of the course.
Prerequisites: T-Dft 204, T-Mat 102, T-Phy 102

T-Dft 211—Mechanisms: Mathematical and drafting room solutions of problems involving the principles of machine elements. Study of motions of linkages, velocities and acceleration of points within a link mechanism; layout methods for designing cams, belts, pulleys, gears and gear trains.
Prerequisites: T-Dft 201 & 204, T-Mat 103, T-Phy 106

T-Mec 211—Physical Metallurgy: Properties of metals and alloys, the reactions of metals, diffusion, carburizing, metal bonding and homogenization; recrystallization and grain growth, age hardening, nitriding, internal oxidation; heat treatment of steel; laboratory experiments and demonstrations.
Prerequisite: T-Mec 210

T-Wld 101—Welding: Familiarization with the various Welding techniques and processes will be taught. These will include Oxyacetylene Welding, Arc Welding, Mig Welding, and Tig Welding.
Prerequisite: None

T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None

SIXTH QUARTER

T-Dft 206—Design Drafting II: Research to solve a problem in design by consulting various manuals, periodicals, and through laboratory experiments. A written technical report, preliminary design sketches, layout drawings, detail drawings, assembly and sub-assembly drawings, pictorial drawings, exploded pictorial assembly, patent drawings and specifications are required as a part of the problem.
Prerequisites: T-Dft 205, T-Dft 210

T-Phy 105—Hydraulics and Pneumatics: The basic theories of hydraulic and pneumatics systems. Combinations of systems in various circuits. Basic design and functions of circuits and motors, controls, electrohydraulic servomechanisms, plumbing, filtration, accumulators and reservoirs.
Prerequisite: T-Phy 102

T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None

T-Bus 101—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

ELECTRONICS TECHNOLOGY

The field of electronics has developed at a rapid pace since the turn of the century. For many years the major concern of electronics was in the area of communications. Developments during World War II and in the period since have revolutionized production techniques. New industries have been established to supplement the need and demand for electronics equipment.

Many opportunities exist for men and women with a technical education in electronics. This curriculum provides a basic background in electronic related theory with practical applications of electronics for business and industry. Courses are designed to develop competent electronics technicians who may take their place as an assistant to an engineer, or as a liaison between the engineer and the skilled craftsman.

The electronics technician may start in one or more of the following areas: research, design, development, production, maintenance or sales. He may be an assistant to an engineer, an engineering aide, laboratory technician, supervisor or equipment specialist. His training is similar to that of an engineer, but in less depth and more practical in application.

ELECTRONICS TECHNOLOGY

	Hours Per Week		Quarter Hours
FIRST QUARTER	**Class**	**Lab**	**Credit**
T-ENG 101—Grammar and Composition	3	0	3
T-MAT 101—Technical Mathematics	5	0	5
T-PHY 101—Physics: Properties of Matter	3	2	4
T-DFT 101—Technical Drafting	0	6	2
T-ELC 101—Fundamentals of Electricity	4	4	6
	15	12	20
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-MAT 102—Technical Mathematics	5	0	5
T-PHY 102—Physics: Work, Energy, Power	3	2	4
T-DFT 102—Technical Drafting	0	6	2
T-ELC 102—Fundamentals of Electricity	4	4	6
	15	12	20
THIRD QUARTER			
T-ENG 103—Report Writing	3	0	3
T-MAT 103—Technical Mathematics	5	0	5
T-ELN 105—Control Devices, Vacuum Tubes & Transistors	4	3	5
T-PHY 104—Physics: Light and Sound	3	2	4
T-ELN 101—Electronic Instruments & Measurements	2	5	5
	17	10	22
FOURTH QUARTER			
T-ENG 204—Oral Communication	3	0	3
T-MAT 201—Technical Mathematics	5	0	5
T-ELN 205—Application of Vac. Tubes & Transistors	2	4	4
T-ELN 232—F.C.C. License Preparation—Laws & Regulations	2	0	2
T-ELN 229—Electronics Project	1	3	2
T-ELN 214—Wave Shaping and Pulse Circuits	2	3	3
	15	10	19
FIFTH QUARTER			
T-ELN 210—Semiconductor Circuit Analysis	4	3	5
T-ELN 215—Wave Shaping and Pulse Circuits	2	4	4
T-ELN 230—Electronic Project	1	6	3
T-MAT 202—Electronic Mathematics	3	0	3
T-SSC 206—American Institutions	3	0	3
	13	13	18
SIXTH QUARTER			
T-BUS 272—Principles of Supervision	3	0	3
T-ELN 233—F.C.C. 2nd and 1st Class License Preparations	4	0	4
T-ELN 220—Electronic Systems	4	2	5
T-ELN 231—Electronic Project	3	6	4
T-ISC 201—Industrial Organization and Management	3	0	3
	17	8	19

ELECTRONICS TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Mat 101—Technical Mathematics: The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None

T-Dft 101—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric, oblique, and perspective are introduced.
Prerequisite: None

T-Elc 101—Fundamentals of Electricity: Elementary principles of electricity including: basic electric units, Ohms law, Kirchhoff's law, network theorems, magnetics, basic electrical measuring instruments, inductance, capacitance, sine wave analysis, and non-resonant resistive, inductive and capacitive networks.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102—Technical Mathematics: A continuation of T-Mat 101. Advance algebraic and trigonometric topics including quadratics, logarithms, determinants, progressions, the binomial expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth.
Prerequisite: T-Mat 101

T-Phy 102—Physics: Work, Energy, Power: Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Mat 101, T-Phy 101

T-Dft 102—Technical Drafting: The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Most important is the introduction of the graphical analysis of space problems. Problems of practical design elements involving points, lines, planes, and a combination of these elements shall be studied. Dimensioning practices for "details" and "working drawings," approved by the American Standard Association will also be included. Introduction is given to intersections and developments of various types of geometrical objects.
Prerequisite: T-Dft 101

T-Elc 102—Fundamentals of Electricity: Series and parallel resonant-circuit analysis, resonant and non-resonant transformer analysis, basic diode power supply analysis, introduction to non-linear resistive control devices, and introduction to electromechanical devices.
Prerequisite: T-Elc 101

THIRD QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 103—Technical Mathematics: The fundamental concepts of analytical geometry, differential and integral calculus are introduced. Topics included are graphing techniques, geometric and algebraic interpretation of the derivative, differentials, rate of change, the integral and basic integration techniques. Applications of these concepts to practical situations are stressed.
Prerequisite: T-Mat 102

T-Eln 105—Control Devices, Vacuum Tubes and Transistors: A study in depth of the electrical characteristics of vacuum tubes and transistors. Basic parameters and applications of each type device to the three configurations of a three-terminal two-port system will be included.
Prerequisite: T-Elc 102

T-Phy 104—Physics: Light and Sound: A survey of the concepts involving wave motion leads to a study of sound, its generation, transmission and detection. The principles of wave motion also serve as an introduction to a study of light, illumination and the principles involved in optical instruments. Application is stressed throughout.
Prerequisites: T-Mat 101, T-Phy 101

T-Eln 101—Electronic Instruments and Measurements: A study of basic electronic instruments, their theory of operation, function, tolerances, and calibration. Both service and laboratory instruments will be studied. Laboratory experience will provide application of each type instrument studied.
Prerequisite: T-Elc 102

FOURTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences and interviews.
Prerequisite: None

T-Mat 201—Technical Mathematics: A continuation of T-Mat 103. More advanced concepts of differentiation and integration are considered. Included are graphs and derivatives of the trigonometric functions, exponential and logarithmic differentiation and integration, advanced integration techniques, polar equations, parametric equations and Fourier series.
Prerequisite: T-Mat 103

T-Eln 205—Applications of Vacuum Tubes and Transistors: Practical applications of vacuum tubes and transistors to basic audio amplifiers, radio frequency amplifiers, detectors, modulators and oscillators.
Prerequisite: T-Eln 105

T-Eln 232—F.C.C. License Preparation—Laws & Regulations: A study of F.C.C. laws and regulations pertaining to the field of communications.
Prerequisite: None

T-Eln 229—Electronics Project: Construction, wiring and testing of functional electronic equipment. Develops wiring and trouble-shooting techniques. Selection to be approved by instructor.

T-Eln 214—Wave Shaping and Pulse Circuits: Broadband amplifiers, magnetic amplifiers, multivibrators, wave shaping techniques, chopper amplifiers, clipper and clamper circuits.
Prerequisites: T-Eln 105, T-Mat 103

FIFTH QUARTER

T-Eln 210—Semiconductor Circuit Analysis: A study in some depth of the analysis and design of transistor circuits. Network theorems and equivalent circuits are used extensively in evaluating total circuit performance. Device peculiarities and limitations pertinent to reliable operations are considered. H.Y.Z. and T. parameters are employed as well as signal flow graphs.
Prerequisite: T-Eln 101

T-Eln 215—Wave Shaping and Pulse Circuits: Pulse techniques, diode switches, gates, step-counters, restorers and other specific circuits which function as switches.
Prerequisite: T-Eln 214

T-Eln 230—Electronics Project: Continuation of project T-Eln 229.

T-Mat 202—Electronic Mathematics: An introductory algebra course with trigonometry and vectors needed in alternating current: algebraic operations of addition, subtraction, multiplication and division; use of letters and signs, grouping, factoring; exponents, ratios and proportions; algebraic and graphic solutions of first-degree equations; introduction to trigonometric functions, their graphs and applications to right triangles. Addition, subtraction and resolution of vector quantities.
Prerequisite: T-Mat 103

T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None

SIXTH QUARTER

T-Bus 272—Principles of Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None

T-Eln 233—F.C.C. 2nd & 1st Class License Preparations: A study of various circuit configurations and theory of radios and transmitters as required by the F.C.C. 2nd and 1st class license.

T-Eln 220—Electronic Systems: A block diagram course investigating numerous electronic systems. Modules or blocks of various circuits already studied are arranged in various manners to produce complex electronic systems. Systems will be explained and reduced to functions and then to block diagrams. AM, FM, and Single Sideband transmitters and receivers, multiplexing, TV transmitters and receivers, pulse-modulated systems, computers, telemetry, navigational systems, sonar and radar will be considered.
Corequisite: T-Eln 215

T-Eln 231—Electronics Project: Advanced continuation of T-Eln 230.

T-Isc 201—Industrial Organization and Management: Organizational structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None

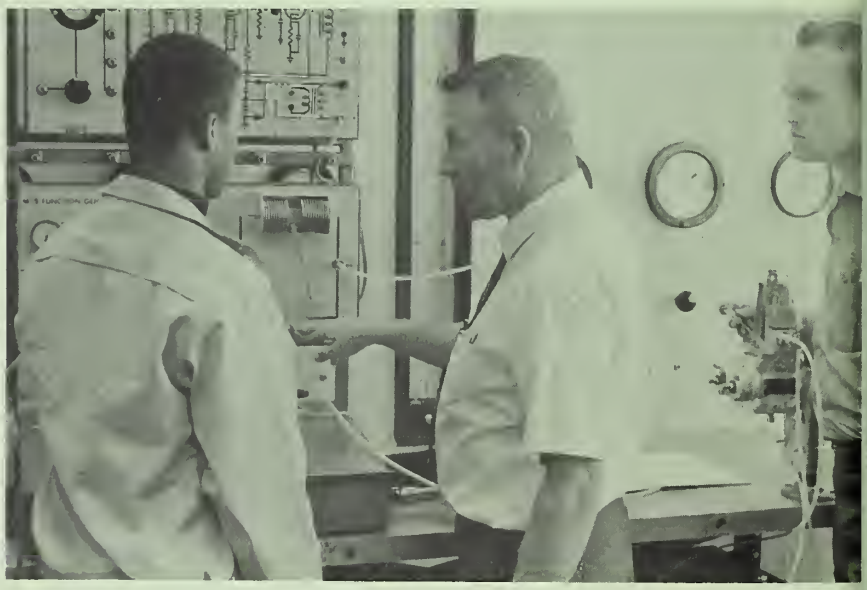
INSTRUMENTATION TECHNOLOGY

Measuring and controlling instruments are now in such widespread use in our modern world that we take them for granted.

The progress of industry depends on precise, effective, and diversified instruments. The Instrumentation Technician has a tremendous responsibility to both production and production control in all industries.

Instruments are used for the measurement and control of industrial manufacturing, conversion, or treating processes. An Instrumentation Technician must deal with variables that affect properties such as temperature, pressure, flow, level, humidity, density, viscosity, etc. In short, instrumentation men are key personnel to keeping a manufacturing firm running. Should any major piece of equipment break down, usually it remains out of operation until such time the instrumentation man can make necessary repairs or adjustments. The Instrumentation Technician in most manufacturing plants works with or assists engineers in their work, and therefore training is similar to that of the engineer.

In many plants when a piece of equipment breaks down employees are laid off until such time the instrumentation man can again repair the equipment and production be resumed. His knowledge of both mechanics and electronics are key factors to how quickly a machine or plant may again resume operation.



INSTRUMENTATION TECHNOLOGY

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
T-ENG 101—Grammar and Composition	3	0	3
T-MAT 101—Technical Mathematics	5	0	5
T-PHY 101—Physics: Properties of Matter	3	2	4
T-DFT 101—Technical Drafting	0	6	2
T-ELC 101—Fundamentals of Electricity	4	4	6
	15	12	20
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-MAT 102—Technical Mathematics	5	0	5
T-PHY 102—Physics: Work, Energy, Power	3	2	4
T-DFT 102—Technical Drafting	0	6	2
T-ELC 102—Fundamentals of Electricity	4	4	6
	15	12	20
THIRD QUARTER			
T-ENG 103—Report Writing	3	0	3
T-MAT 103—Technical Mathematics	5	0	5
T-ELN 105—Control Devices, Vacuum Tubes & Transistors	4	3	5
T-PHY 104—Physics: Light and Sound	3	2	4
T-ELN 101—Electronic Instruments & Measurements	2	5	5
	17	10	22
FOURTH QUARTER			
T-MAT 201—Technical Mathematics	5	0	5
T-CHM 111—General Chemistry	4	3	5
T-MEC 241—Control Devices, Pneumatic	1	4	3
T-ELN 103—Measuring and Control	1	3	2
T-MEC 103—Shop Practice	1	3	2
	12	13	17
FIFTH QUARTER			
T-ELN 206—Industrial Applications for Vacuum Tubes & Transistors	2	4	4
T-ELN 217—Calibration and Standardization	1	3	2
T-CHM 227—Physical Chemistry	3	2	4
T-MEC 242—Control Devices, Pneumatic	1	6	4
T-PSC 205—Record Keeping for Quality Control	3	0	3
	10	15	17
SIXTH QUARTER			
T-ELN 226—Control Systems Analysis	3	6	5
T-BUS 272—Principles of Supervision	3	0	3
T-ELN 212—Use & Maintenance of Test Equipment	2	3	3
T-ELN 214—Wave Shaping and Pulse Circuits	2	3	3
T-SSC 206—American Institutions	3	0	3
	13	12	17

INSTRUMENTATION TECHNOLOGY

BRIEF DESCRIPTION OF COURSES

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Mat 101—Technical Mathematics: The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Phy 101—Physics (Properties of Matter): A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None

T-Dft 101—Technical Drafting: The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric, oblique, and perspective are introduced.
Prerequisite: None

T-Elc 101—Fundamentals of Electricity: Elementary principles of electricity including: Basic electric units, Ohms law, Kirchhoff's law, network theorems, magnetics, basic electrical measuring instruments, inductance, capacitance, sine wave analysis, and non-resonant resistive inductive and capacitive networks.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102—Technical Mathematics: A continuation of T-Mat 101. Advance algebraic and trigonometric topics including quadratics, logarithms, determinants, progressions, the binomial expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth.

Prerequisite: T-Mat 101
T-Phy 102—Physics (Work, Energy, Power): Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: T-Mat 101, T-Phy 101

T-Dft 102—Technical Drafting: The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Most important is the introduction of the graphical analysis of space problems. Problems of practical design elements involving points, lines, planes, and a combination of these elements shall be studied. Dimensioning practices, approved by the American Standards Association will also be included. Introduction is given to intersections and developments of various types of geometrical objects.
Prerequisite: T-Dft 101

T-Elc 102—Fundamentals of Electricity: Series and parallel resonant-circuit analysis, resonant and non-resonant transformer analysis, basic diode power supply analysis, introduction to non-linear resistive control devices, and introduction to electromechanical devices.
Prerequisite: T-Elc 101

THIRD QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a backgrounds for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 103—Technical Mathematics: A continuation of T-Mat 101. Advanced algebraic and trigonometric topics including quadratics, logarithms, determinants, progressions, the binominal expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth.
Prerequisite: T-Mat 102

T-Eln 105—Control Devices, Vacuum Tubes and Transistors: A study of the electrical characteristics of vacuum tubes and transistors and the basic parameters and applications of each including the magnetic amplifier.
Prerequisite: None

T-Phy 104—Physics: Light and Sound: A survey of the concepts involving wave motion leads to a study of sound, its generation, transmission and detection. The principles of wave motion also serves as an introduction to a study of light, illumination and the principles involved in optical instruments. Application is stressed throughout.
Prerequisites: T-Mat 101, T-Phy 101

T-Eln 101—Electronic Instruments and Measurements: A study of basic electronic instruments, their theory of operation, function, tolerances, and calibration. Both service and laboratory instruments will be studied. Laboratory experience will provide application of each type instrument studied.
Prerequisite: T-Elc 102

FOURTH QUARTER

T-Mat 201—Technical Mathematics: A continuation of T-Mat 103. More advanced concepts of differentiation and integration are considered. Included are graphs and derivatives of the trigonometric functions, exponential and logarimhtci differentiation and integration, advanced integration techniques, polar equations, papametric equations and Fourier series.
Prerequisite: T-Mat 103

T-Chm 111—General Chemistry: An introductory chemistry course involving chemical terminology, atomic structure, properties of some elements, and the function of the periodic table. Properties of compounds and mixtures are studied as are types of chemical reactions. Laboratory work consists of various inorganic reactions and preparations.
Prerequisite: None

T-Mec 241—Control Devices, Pneumatic: A study of pneumatic control theory, controller mechanisms, transmitter theory and recorders.
Prerequisite: T-Phy 101

T-Eln 103—Measuring and Control: A study of measurement of various energy levels related to Industrial Processes. An introduction to automated control fundamentals using the controller actions: On-Off control, proportional control, proportional plus reset control, or proportional plus reset and rate control. Also trouble shooting methods will be covered.
Prerequisite: T-Eln 101

T-Mec 103—Shop Practice: A study of hand tools and practices as required of those who are charged with the servicing maintenance and repair of instrumentation equipment.
Prerequisite: None

FIFTH QUARTER

T-Eln 206—Industrial Applications of Vacuum Tubes and Transistors: A study in detail of a variety of circuit configurations that are common in the electronic instrumentation industry.
Prerequisite: T-Eln 105

T-Eln 217—Calibration and Standardization: Course to illustrate the philosophy of measurement and control, emphasizing the meaning of validity, sensitivity and control devices, units of measurement, and levels of accuracy and trace ability.
Prerequisite: T-Eln 103

T-Chm 227—Physical Chemistry: Atomic theory, states of matter, chemical thermodynamics, molecular properties of solutions, equilibria, phase role, electrochemistry, kinetics, surface chemistry, and photochemistry constitute major areas of study.
Prerequisite: T-Chm 111

T-Mec 242—Control Devices, Pneumatic: A study of various loop configurations and applications of pneumatic controllers and recorders.
Prerequisite: T-Mec 241

T-Isc 205—Record Keeping for Quality Control: The basic principles, methods, and procedures for recording and analyzing collected data from electronic recording machines. This course also involves the study of the collected data for purposes of quality control and production costs.
Prerequisite: None

SIXTH QUARTER

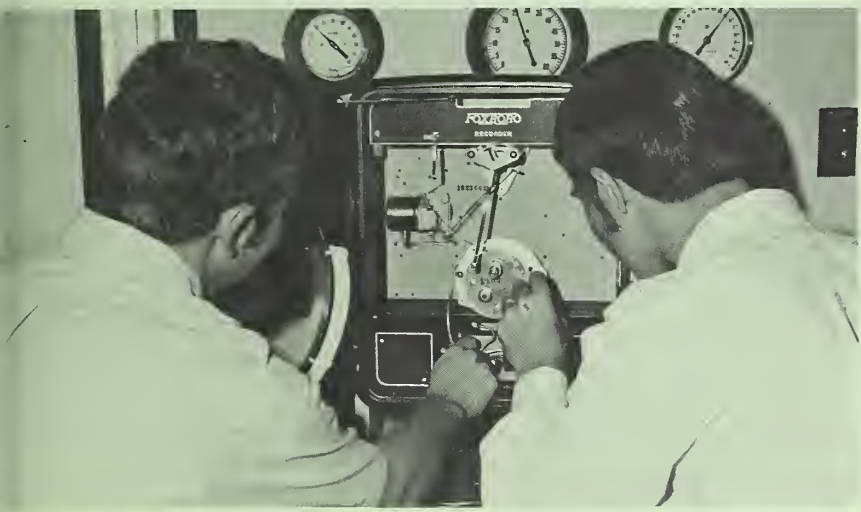
T-Eln 226—Control System Analysis: A study of the response of systems to instrument control based upon consideration of the system components. Negative and positive feedback along with the implications of closed loop control are covered.
Prerequisite: T-Mec 242

T-Bus 272—Principles of Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None

T-Eln 212—Use and Maintenance of Test Equipment: A study of test equipment that is normally encountered in the instrument lab and repair shops. These instruments include the oscilloscope, potentiometer, VOM, VTVM, digital voltmeters, current calibrations, tube and transistor testers.
Prerequisite: None

T-Eln 214—Wave Shaping and Pulse Circuits: Broadband amplifiers, magnetic amplifiers, multivibrators, wave shaping techniques, chopper amplifiers, clipper and clamper circuits.
Prerequisites: T-Eln 105, T-Mat 103

T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None



MARINE TECHNOLOGY

Marine scientific advances of the past decade have led to the development of a strong marine technician training program for North Carolina. A thorough study of marine occupations has shown a great need for personnel trained in the use of modern oceanographic and fishing equipment and techniques. The technological developments of the last ten years have made available to marine scientists the new sophisticated equipment, such as electronic devices for navigation, electronic fish-finders, new devices for data acquisition and reduction, and new methods of carrying out oceanographic research at sea.

As in other facets of our mechanical life, the methods used in past years do not suffice today. Efficiency in the use of all the modern tools available is necessary for success in today's marine science operations.

The Marine Technology program includes a curriculum with a strong base in the science and mathematics needed to meet the challenging requirements of the marine research technician. This two-year curriculum will provide the student with a first-hand opportunity to become proficient in the knowledge and skills of the field. Practical training and cooperative research will be conducted aboard the school's research vessel, The Advance II, which is docked at the Cape Fear Technical Institute at Wilmington, North Carolina.

Each student will be assigned daily duties in maintaining the training vessel in addition to classroom instruction and will be directly involved in the operation of the ship and all research activities on all training cruises.

Graduates of this curriculum may perform experiments and data acquisition and reduction activities associated with the marine laboratory; may operate radar, loran, direction finders, ship radio, depth recorders, fish-finders, and the gyro compass. In addition, they may participate in fish-dragging operations, use of electronic devices, and perform the daily routine tasks necessary for the proper maintenance of the vessel. Marine Technology graduates will have received instruction in navigation, oceanography, marine engineering, and marine biology. Graduates of this curriculum may find job opportunities with the U. S. Navy Oceanographic Office, the U. S. Geodetic Survey, research foundations, private survey companies, marine salvage companies, marine construction companies, fish-processing plants, marinas, boat yards or private fishing concerns. They may also find employment on towboats and yachts.

Prerequisites: Admission requirements and at least one year of high school algebra.

MARINE TECHNOLOGY

9 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

FIRST QUARTER	Hours Per Week Class	Lab	Quarter Hours Credit
T-ENG 101—Grammar and Composition	4	0	3
T-MAT 101—Technical Mathematics	6	0	5
T-MSC 101—Navigation	2	2	2
T-PME 101—Internal Combustion Engines & Aux. Equipment	1	3	2
T-MSC 111—Practical Fishing Operations	1	3	2
T-BIO 110—General Biology	3	2	3
T-MSC 121—Ship's Maintenance	0	3	1
	17	13	18
T-SHI 101—Ship Experience (2 weeks) per week hours	0	40	2
			20

9 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

SECOND QUARTER			
T-ENG 102—Grammar and Composition	4	0	3
T-MAT 102—Technical Mathematics	6	0	5
T-MSC 102—Navigation	2	2	2
T-PME 102—Internal Combustion Engines & Aux. Equipment	1	3	2
T-MSC 112—Practical Fishing Operations	1	3	2
T-BIO 131—Marine Biology	3	2	3
T-MSC 122—Ship's Maintenance	0	3	1
	17	13	18
T-SHI 102—Ship Experience (2 weeks) per week hours	0	40	2
			20

9 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

THIRD QUARTER			
T-ENG 204—Oral Communications	4	0	3
T-MAT 103—Technical Mathematics	6	0	5
T-MSC 103—Navigation	2	2	2

T-PME 103—Internal Combustion Engines & Aux. Equipment	1	3	2
T-MSC 113—Practical Fishing Operations	1	3	2
T-BIO 132—Marine Biology	3	2	3
T-MSC 123—Ship's Maintenance	0	3	1
	17	13	18
T-SHI 103—Ship Experience (2 weeks) per week hours	0	40	2
			17
			20

6 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

FOURTH QUARTER

T-ENG 103—Report Writing	5	0	3
T-MAT 201—Technical Mathematics	9	0	5
T-MSC 104—Navigation and Cartography	2	2	2
T-MSC 114—Practical Fishing Operations	1	3	2
T-MSC 213—Marine Fishery Science	3	2	2
T-MSC 124—Ship's Maintenance	0	3	1
	20	10	15
T-SHI 104—Ship Experience (2 weeks) per week hours	0	40	2
			17
T-SHI 109—Ship Experience Overtime (Hrs. adjustment over 4 quarter period of cruises)) @ 40 hrs. per quarter	0	160	0
			17

9 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

FIFTH QUARTER

T-PHY 103—Physics: Electricity	4	2	4
T-CHM 101—Introduction to Chemistry	4	2	4
T-MSC 207—Introduction to Oceanography	4	3	4
T-GEO 101—Geology	3	2	3
T-MSC 110—Scuba Diving (or T-MSC 130) T-MSC 130—Oceanographic Equipment (or T-MSC 110)	0	3	1
T-MSC 125—Ship's Maintenance	0	3	1
	15	15	17
T-SHI 105—Ship Experience (2 weeks) per week hours	0	40	2
			19

9 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

SIXTH QUARTER

T-PHY 101—Physics: Properties of Matter	4	2	4
T-MSC 208—Oceanography (Chemical)	4	3	4
T-MET 101—Meteorology	3	2	3
T-ELN 132—Shipboard Electronics	4	2	4
T-MSC 131—Oceanographic Equipment	0	3	1
T-MSC 126—Ship Maintenance	0	3	1
	15	15	17
T-SHI 106—Ship Experience (2 weeks) per week hours	0	40	2
			19

9 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

SEVENTH QUARTER

T-PHY 102—Physics: Work, Energy, Power	4	2	4
T-MSC 209—Oceanography (Physical)	4	3	4
T-MSC 134—Marine Welding	2	2	2
T-ELN 133—Shipboard Electronics	4	2	4
T-MSC 132—Oceanographic Equipment	0	3	1
T-MSC 127—Ship's Maintenance	0	3	1
	14	15	16
T-SHI 107—Ship Experience (2 weeks) per week hours	0	40	2
			18

6 WEEKS SCHOOL—2 WEEKS SHIP RELATED EXPERIENCES

EIGHTH QUARTER

T-AHR 206—Marine Refrigeration	4	4	3
T-MSC 210—Oceanography (Instrumentation)	4	3	4
T-ELN 134—Shipboard Electronics	2	4	2
T-MAT 211—Basic Statistics	4	0	3
T-MSC 133—Oceanographic Equipment	0	3	1
T-MSC 128—Ship's Maintenance	0	2	1
	14	16	14
T-SHI 108—Ship Experience (2 weeks) per week hours	0	40	2
			16
T-SHI 109—Ship Experience overtime (Hrs. adjustment over 4 quarter period of cruises) @ 40 hrs. per quarter	0	160	0
			16

MARINE TECHNOLOGY

COURSE DESCRIPTION BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammer, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequiiste: None

T-Mat 101—Technical Mathematics: The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Msc 101—Navigation: Theory of navigation with a comprehensive study of the compass, compass error and its applications, various types of charts, plotting, piloting, navigation aids, buoys, lights, rules of the road, basic electronic navigation, Mercator and Great Circle sailing. Theory and practical application of shipboard procedures and seamanship.
Prerequisite: None

T-Pme 101—Internal Combustion Engines and Aux. Equipment: The principles of operation of 2-cycle and 4-cycle internal combustion marine engines. Testing of engine performance, servicing and maintenance of pistons, valves, cams, camshafts, fuel and exhaust systems, cooling systems, proper lubrication, and methods of testing, diagnosing, and repairing. Emphasis will be given to the proper maintenance and preservation of marine engines.
Prerequisite: None

T-Msc 111—Practical Fishing Operations: A study of the many types of devices and nets involved in the capture, transportation, and preservation of marine food animals. Laboratory exercises, lectures, and demonstrations will include schematics and rigging of the otto trawl. Fabrication of bottom dredges, construction of fish traps; long lining for swordfish and tuna. Students will be given an introduction to the fishfinder, yankee trawling, and the manufacture and use of various types of fishing buoys.
Prerequisite: None

T-Bio 110—Biology (General): A general review of the basic principles in biology that would pertain to the study of Marine Biology.
Prerequisite: None

T-Msc 121—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: None

T-Shi 101—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: None

SECOND QUARTER (WINTER)

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102—Technical Mathematics: A continuation of T-Mat 101. Advanced algebraic and trigonometric topics including quadratics, logarithms, deteriminants, progressions, the binomial expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth.
Prerequisite: T-Mat 101

T-Msc 102—Navigation: Practical problems in piloting including danger angles, soundings and effects of tides and currents. An introduction to celestial navigation covering topics, such as celestial equator system of coordinates, navigational triangle, lines of position, observed altitudes, and adjusting the compass. Laboratory exercises and experience will be given on aids to navigation including radar, radio direction finders, sonar echo ranging, depth recorders, gyro compass, etc. Shipboard procedures and practical seamanship will be stressed.
Prerequisite: T-Msc 101

T-Pme 102—Internal Combustion Engine and Aux. Equipment: A comprehensive study of marine auxiliary equipment, such as pumps, winches, compressors, generators, anchor windless, electrical steering apparatus, etc. Laboratory and shop practices in the repair and operation of ship's mechanical devices, engine

room and generator room logs and records, and preventative maintenance procedures on all equipment.
Prerequisite: T-Pme 101

T-Msc 112—Practical Fishing Operations: A study of the technique of capturing porgies, herring, mullet, tuna, shrimps, and menhaden. Field trips will be used to demonstrate modern methods employed in the bailing and pumping of the catch at sea and at the plant. A portion of this course will be devoted to the sport fishing industry and will include a study of the equipment as well as the methods and procedures used in the location, capture, and preservation of animals pertinent to the industry.
Prerequisite: T-Msc 111

T-Bio 131—Marine Biology: Survey of marine animals and plants and their interrelationships including food chain, predation, parasitism and symbols. Study of morphology, identification and classification of marine organisms in North Carolina waters. General understanding of life cycles, population changes and distribution as influenced by environmental factors. Proper procedures of collecting samples of living organisms using plankton samplers, corers, dredges, and nets.

T-Msc 122—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: T-Msc 121

T-Shi 102—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: T-Shi 101

THIRD QUARTER (SPRING)

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Mat 103—Technical Mathematics: The fundamentals concepts of analytical geometry, differential and integral calculus are introduced. Topics included are graphing techniques, geometric and algebraic interpretation of the derivatives.
Prerequisite: T-Mat 102

T-Msc 103—Navigation: Advanced theory and practice involving celestial navigation, elementary meteorology, storm tracking, winds, air pressure, and weather instruments. Laboratory exercises in navigation problems with additional work assigned in shipboard procedures, sanitation, and practical seamanship.
Prerequisite: T-Msc 102

T-Pme 103—Marine Diesel Engines: Basic marine diesel principles and components, their applications and relationships. Fundamental principles involved in transformation of heat energy to mechanical energy. Theory of fuels, exhaust systems, injectors, pumps, combustion and pre-combustion chambers, and air induction systems. Laboratory practices will be directed

to the proper maintenance, operation, and safety factors of the marine diesel engine.
Prerequisite: T-Pme 102

T-Msc 113—Practical Fishing Operations: Emphasis will be placed upon equipment repair and net mending. Students will make both major and minor repairs to all pieces of equipment used in fishing operations. A major portion of this course will be devoted to the various fish traps, their construction and use.
Prerequisite: T-Msc 112

T-Bio 132—Marine Biology: A study of the life and distribution of pelagic fish and bottom living fish with emphasis on the problem of over-fishing and under-fishing. Additional study will be given in marine animal identification as well as fish tagging methods with an introduction to fish farming and controlled raising of fish as a profitable business. The study of commercially valuable crustacea and mollusca.
Prerequisite: T-Bio 131

T-Msc 123—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: T-Msc 122

T-Shi 103—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: T-Shi 102

FOURTH QUARTER (SUMMER)

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 201—Technical Mathematics: A continuation of T-Mat 103 dealing with the fundamental concepts of analytical geometry, differential and integral calculus.
Prerequisite: None

T-Msc 104—Navigation and Cartography: Advanced practice and theory in Celestial Navigation, Elementary Meteorology, Storm Tracking, Air Pressure and Weather instruments. Laboratory exercises in Navigation and work assignments in Marine Cartography.
Prerequisite: T-Msc 103

T-Msc 114—Practical Fishing Operations: Students will study and design haulseines and trawls for the various species of fish, shrimp, and so forth. This course also includes putting the proper weights and floats on nets in order that they may be fished on the bottom or high in the ocean.
Prerequisite: T-Msc 113

T-Msc 213—Marine Fishery Science: The objective of this course is to study life histories and distribution of Marine fishes with emphasis on commercial species. Other objectives in this course will include the gaining of knowledge of fisheries, fishing methods, gear, and preservation methods.
Prerequisite: None

T-Msc 124—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: T-Msc 123

T-Shi 104—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: T-Msc 103

T-Shi 109—Ship Experience Overtime: While at sea two weeks each quarter, students will be putting in work weeks of 60 hours or more in applying the skills they are in the process of learning. This course is to give recognition and credit for those hours in excess of the normal 40 hour work week. Each quarter that a student spends two weeks at sea, 40 hours of overtime credit will be applied to this course number.

FIFTH QUARTER

T-Phy 103—Physics (Electricity): Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisite: T-Mat 101

T-Chem 101—Introduction to Chemistry: Study of the physical and chemical properties of substances; chemical changes; elements, compounds, gases, chemical combination; weights and measurements; theory of metals; acids, bases, salts, solvents, solutions, and emulsions. In addition, study of carbohydrates; electrochemistry, electrolytes, and electrolysis in their application of chemistry to industry.
Prerequisite: None

T-Msc 207—Introduction to Oceanography: This will be a survey course in oceanography touching on all aspects of the science. The emphasis here will be towards the practical, with exposure to the research vessel and a variety of oceanographic instruments. Actual research techniques will be conducted in the field and aboard ship during the course.
Prerequisite: None

T-Geo 101—Geology: The study and identification of minerals and other physical features of the ocean floor. This course will include the identification of rocks and other mineral samples obtained from the ocean bottom. The physical characteristics of the ocean floor will be studied in depth.
Prerequisite: None

T-Msc 110—Scuba Diving: This course covers not only scuba diving techniques, but also the terminology, physics, and safety connected with this fast-growing, scientifically associated sport. Students will also be schooled in the proper use and care of diving equipment including underwater photographic equipment, compressors, and lights. This optional course is offered by an outside agency. Each student must make his own registration and pay charges to that agency.
Prerequisite: None

T-Msc 130—Oceanographic Equipment: This is a sequence course in which every student will be taught proper procedures for maintenance, of all oceanographic laboratories as well as storage and repair of equipment and instruments. Quarterly assignments will require that students actually assume the responsibility of not only inventory, but design and development of new tools.
Prerequisite: None

T-Msc 125—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: T-Msc 124

T-Shi 105—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: T-Shi 104

SIXTH QUARTER

T-Phy 101—Physics (Properties of Matter): A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None

T-Msc 208—Oceanography (Chemical): This course will cover all types of oceanographic water sampling employed in research at sea today, many analytical techniques will also be taught, including classical as well as contemporary ones. The letter utilizing modern chemical instrumentation. Students will be actually conducting chemical analyses of sea water on cooperative research ventures.
Prerequisites: T-Chm 101; T-Msc 207

T-Met 101—Meteorology: Introduces the student to the basic principles of meteorology. Basic weather observation and forecasting is emphasized utilizing barometric pressures, relative humidities, temperatures, wind directions, weather maps, etc. Care and upkeep of instruments is stressed.
Prerequisite: None

T-Eln 132—Shipboard Electronics: A course designed to provide the marine technology student with general information on the operational concept and capabilities of shipboard electronic equipment used for navigation, communication, oceanography, and fishery operations.
Prerequisite: T-Phy 103

T-Msc 131—Oceanographic Equipment: This is a sequence course in which every student will be taught proper procedures for maintenance, of all oceanographic laboratories as well as storage and repair of equipment and instruments. Quarterly assignments will require that students actually assume the responsibility of not only inventory, but design and development of new tools.
Prerequisite: None

T-Msc 126—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students wlil be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: T-Msc 125

T-Shi 106—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: T-Shi 105

SEVENTH QUARTER

T-Phy 102—Physics (Work, Energy, Power): Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: T-Mat 101, T-Phy 101

T-Msc 209—Oceanography (Physical): Students will be taught methods of physical data acquisition, they will use the oceanographic instruments necessary, will participate in the actual collection of physical data at sea, and will learn how to correct this data and reduce it to some standard format.
Prerequisite: T-Msc 208

T-Msc 134—Marine Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Metallurgy of welding discussed. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding and flame cutting. Emphasis on electric arc and gas welding methods applicable to mechanical repair work. Brazing also covered.
Prerequisite: None

T-Eln 133—Shipboard Electronics: To familiarize the student with the function and operation of electronic equipment used aboard ship for navigation, communication, oceanography and fishery operations.
Prerequisite: T-Eln 132

T-Msc 132—Oceanographic Equipment: This is a sequence course in which every student will be taught proper procedures for maintenance, of all oceanographic laboratories as well as storage and repair of equipment and instruments. Quarterly assignments will require that students actually assume the responsibility of not only inventory, but design and development of new tools.
Prerequisite: T-Msc 131

T-Msc 127—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section of the ship.
Prerequisite: T-Msc 126

T-Shi 107—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prerequisite: T-Shi 106

EIGHTH QUARTER

T-Ahr 206—Marine Refrigeration: A basic study of essential refrigeration terminology; laws of refrigeration; heat and methods of transfer; the compression system; compressors, refrigerants and their characteristics; pressure-temperature relationships; conventional, hermetic and absorption system of refrigeration; and special shipboard refrigeration systems.
Prerequisite: None

T-Msc 210—Oceanography (Instrumentation): A detailed study of the scientific equipment used for oceanography. This course includes equipment design, installation, care and operation. Also, included will be calibration and adjustment of all kinds of oceanographic equipment, and design and construction of shipboard oceanographic facilities.
Prerequisite: T-Msc 207

T-Eln 134—Shipboard Electronics: A continuation of T-Eln 133—To familiarize the student with the function and operation of electronic equipment used aboard ship for navigation, communication, oceanography and fishery operations.
Prerequisite: T-Eln 133

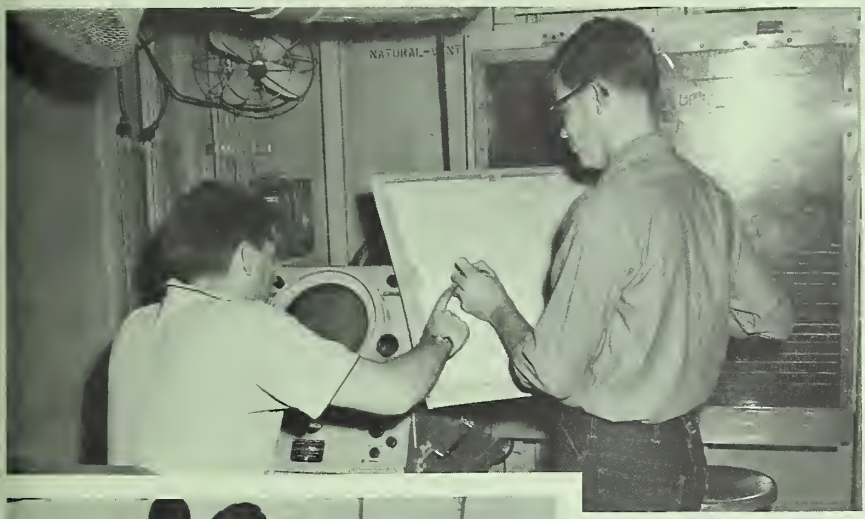
T-Mat 211—Basic Statistics: Point and intermal estimates; chi-squares; frequency distribution; ratios, rates and percentages. Normal distribution: mean and standard deviation; interval estimates; t-distribution; coefficient for variation.
Prerequisite: T-Mat 201

T-Msc 133—Oceanographic Equipment: This is a sequence course in which every student will be taught proper procedures for maintenance, of all oceanographic laboratories as well as storage and repair of equipment and instruments. Quarterly assignments will require that students actually assume the responsibility of not only inventory, but design and development of new tools.
Prerequisite: T-Msc 132

T-Msc 128—Ship's Maintenance: A practical laboratory experience course where students are assigned work in all phases of ship maintenance and repair. Students will be assigned to various staff members of the ship who will supervise their preventative maintenance work program. It is expected that students will be rotated to receive working experience in every section or part of the ship.
Prerequisite: T-Msc 127

T-Shi 108—Ship Experience: Each student will receive two weeks of sea experiences during the quarter. This two week period may be in one two-week cruise or several smaller cruises totaling the two week period. On each cruise students will be rotated to various assignments and laboratory experiment projects for experience. During these cruises, students may apply the theories and practices they studied while ashore.
Prrequisite: T-Shi 107

T-Shi 109—Ship Experience Overtime: While at sea two weeks each quarter, students will be putting in work weeks of 60 hours or more in applying the skills they are in the process of learning. This course is to give recognition and credit for those hours in excess of the normal 40 hour work week. Each quarter that a student spends two weeks at sea, 40 hours of overtime credit will be applied to this course number.
Prerequisite: None



MARINE LABORATORY TECHNOLOGY

Graduates of this program will serve in a technical capacity in oceanographic and other marine-oriented laboratories assisting professional scientists with basic research in biology, geology, physics and chemistry. The ocean science technician will also participate in shipboard surveys whenever such occasion becomes necessary; will be familiar with the kinds of measuring and sampling equipment used in oceanography; will operate the shipboard laboratory, will master techniques and methods commonly employed in oceanographic operations.

The technician will inherit much of the responsibility associated with the laboratory, (through a working alliance with the professional scientist), by relieving the scientist from many of the technical obstacles standing in the path of pure research.

MARINE LABORATORY TECHNOLOGY

FIRST YEAR

FIRST QUARTER	Hours Per Week Class	Lab	Quarter Hours Credit
T-ENG 101—Grammar and Composition	3	0	3
T-MAT 101—Technical Mathematics	5	0	5
T-BIO 110—General Biology	2	2	3
T-PHY 101—Physics: Properties of Matter	3	2	4
T-MSC 206—Introduction to Oceanography	3	0	3
	16	4	18
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-MAT 102—Technical Mathematics	5	0	5
T-BIO 111—Microbiology	3	2	4
T-PHY 103—Physics: Electricity	3	2	4
T-MSC 110—Scuba Diving or (T-BUS 102—Typewriting)	0	3	1
	14	7	17
THIRD QUARTER			
T-ENG 103—Report Writing	3	0	3
T-MAT 103—Technical Mathematics	5	0	5
T-BIO 133—Invertebrate Zoology I	3	2	4
T-CHM 101—General Chemistry	3	2	4
T-MSC 210—Oceanography (Instrumentation)	3	2	4
	17	6	20

SECOND YEAR

FOURTH QUARTER			
T-ENG 204—Oral Communication	3	0	3
T-MAT 201—Technical Mathematics	5	0	5
T-ELN 127—Fundamentals of Electronics	3	2	4
T-CHM 108—Analytical Chemistry	3	2	4
T-BIO 134—Invertebrate Zoology II	3	2	4
	17	6	20
FIFTH QUARTER			
T-SSC 206—American Institutions	3	0	3
T-MAT 211—Basic Statistics	3	0	3
T-MSC 211—Oceanographic Techniques	3	2	4
T-GEO 101—Geology	3	0	3
T-MSC 201—Aquarium Systems	2	3	3
T-MET 101—Meteorology	2	2	3
	16	7	19
SIXTH QUARTER			
T-MSC 100—Small Boat Handling and Engine Repair	0	3	1
T-MSC 217—Special Problem (Lab Project)	2	5	4
T-MSC 203—Marine Ecology	3	2	4
T-MSC 214—Marine Fishery Science	3	2	4
T-PHO 110—Photography, Introduction to	3	0	3
	11	12	16

MARINE LABORATORY TECHNOLOGY

COURSE DESCRIPTION BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Mat 101—Technical Mathematics: The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed.
Prerequisite: Satisfactory evidence that admission requirements have been met.

T-Bio 110—Biology (General): A general review of the basic principles in biology that would pertain to the study of Marine Biology, designed as a survey course for the future technician.
Prerequisite: None

T-Phy 101—Physics: Properties of Matter: A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: T-Mat 101

T-Msc 206—Introduction to Oceanography: The meaning and potentiality of oceanography; historical aspects; geological features of the oceans; interrelations between land and sea. General physical and chemical properties of sea water and their relationships to living organisms. Instruments and equipments used in the study of oceanography.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition—A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Mat 102—Technical Mathematics: A continuation of T-Mat 101. Advanced algebraic and trigonometric topics including quadratics, logarithms, deteriminants, progressions, the binomial expansion, complex functions are studied in depth.
Prerequisite: T-Mat 101

T-Bio 111—Microbiology, Marine: The role of microorganisms in the economy and productivity of the sea, and the methods used to collect and study them. Techniques commonly employed in laboratories will be emphasized.
Prerequisite: T-Bio 110

T-Phy 103—Physics: Electricity: Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: T-Phy 101, T-Mat 101

T-Msc 110—Scuba Diving: This course covers not only diving techniques, but also the terminology, physics, and safety connected with this fast-growing, scientific sport. Students will also be schooled in the proper use and care of diving equipment including underwater photographic equipment.
Prerequisite: None

THIRD QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Mat 103—Technical Mathematics: The fundamental concepts of analytical geometry, differential and integral calculus are introduced. Topics included are graphing techniques, geometric and algebraic interpretation of the derivative, differentials, rate of change, the integral and basic integration techniques. Applications of these concepts to practical situations are stressed.
Prerequisite: T-Mat 102

T-Bio 133—Invertebrate Zoology I: Functional classification and ecology of invertebrate animals, with special attention to local marine forms, practical field and laboratory methods of study, collection and preservation will be taught, such as volumins and counting of pelagic plankton, qualitative and quantitative sampling with nets will also be included as part of the training program.
Prerequisite: T-Bio 110

T-Chm 101—General Chemistry: Study of the physical and chemical properties of substances, chemical changes; elements, compounds, gases, chemical combinations; weights and measurements; theory of metals; acids, bases, salts, solvents, solutions, and emulsions. In addition, study of carbohydrates; electro-chemistry, electrolytes, and electrolysis in their application of chemistry to industry.
Prerequisite: T-Mat 101

T-Msc 210—Oceanography (Instrumentation): A study of the scientific equipment used for oceanography. This course includes equipment design, installation, care and operation. Also included will be calibration and adjustment of those instruments used in making physical and chemical measurements in sea water.
Prerequisite: None

FOURTH QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Mat 201—Technical Mathematics: A continuation of T-Mat 103. More advanced concepts of differentiation and integration are considered. Included are graphs and derivatives of the trigonometric functions, exponential and logarithmic differentiation and integration, advanced integration techniques, polar equations, parametric equations and Fourier series.
Prerequisite: T-Mat 103

T-Eln 127—Fundamentals of Electronics: A study of basic electronic instruments, their theory of operation, function, tolerances, and calibration. Both service and laboratory instruments will be studied. Laboratory experience will provide application of each type instrument studied.
Prerequisite: T-Phy 101 and 103

T-Chm 108—Analytical Chemistry: Students will be taught how to analyze the chemical composition and properties of sea water; included also will be such practical techniques as use of balances, mixing of solutions, and quantitative methods of sea water analysis for minerals, gases and nutrients. Titrimetric as well as automatic methods will be learned.
Prerequisite: T-Chm 101—High School Chemistry—successful completion of the previous courses.

T-Bio 134—Invertebrate Zoology II: Study of adaptions and responses of invertebrate animals to their marine and estuarine habitats. Interrelationships of organisms within these environments. Many of the techniques learned in T-Bio 133 will be applied in actual projects during this course.
Prerequisite: T-Bio 133

FIFTH QUARTER

T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None

T-Mat 211—Basic Statistics: Point and interval estimates; chi-squares; frequency distribution; ratios, rates and percentages. Normal distribution; mean and standard deviation; interval estimates; t-distribution; coefficient of variation.
Prerequisite: T-Mat 103

T-Msc 211—Oceanographic Techniques: Practical experience with the types of measuring and sampling devices used at sea and ashore. Contemporary methods of acquisition, correction and reduction of observed oceanographic data will be employed on actual research projects in this course.
Prerequisite: None

T-Geo 101—Geology: The study and identification of minerals and other physical features of the ocean floor. This course will include the identification of rocks and other mineral samples obtained from the ocean bottom. The physical characteristics of the ocean floor will be studied in depth.
Prerequisite: None

T-Msc 201—Aquarium Systems: A study of the various marine aquariums and accessories including filters, pumps and other control mechanisms. Students will maintain animal and plant life in controlled aquarium environments.
Prerequisite: None

T-Met 101—Meteorology: Introduces the student to the basic principles of meteorology. Basic weather observation and forecasting is emphasized utilizing barometric pressures, relative humidities, temperatures, wind directions, weather maps, etc. Care and upkeep of instruments is stressed.
Prerequisite: None

SIXTH QUARTER

T-Msc 100—Small Boat Handling and Engine Repair: This course will include the fundamentals of safe boat handling, minor engine servicing, and repairing, and everyday rules of the road boating regulations. Boating safety will be emphasized throughout this course.
Prerequisite: None

T-Msc 217—Special Problem (Lab Project): Special projects approved by the instructor on either an individual, group, or class basis will be undertaken either by an individual, group, or by the entire class.
Prerequisite: None

T-Msc 203—Marine Ecology: The ocean as an environment, with special reference to shallow and estuarine regions. Behavior, environmental factors and productivity as they relate to the distribution and abundance of organisms.
Prerequisite: None

T-Msc 214—Marine Fishery Science: The objective of this course is to study life histories and distribution of Marine fishes with emphasis on commercial species. Other objectives in this course will include the gaining of knowledge of fisheries, fishing methods, gear, and preservation methods.
Prerequisite: None

T-Pho 110—Introduction to Photography: A basic course in photographing of objects, and in developing film and prints. Students will study the taking of pictures with the use of natural and artificial lighting.
Prerequisite: None

SECRETARIAL — ENGINEERING AND TECHNICAL

The Engineering and Technical Secretary Curriculum is designed to prepare a student for a position in the office of a firm dealing in research, development and production in the scientific fields. The curriculum offers students the necessary secretarial skills and the required background of understanding and appreciation of the scientific method, the beginnings of a technical vocabulary and a feeling of respect for accuracy that will be essential in later work in the field.

Graduates of this program may qualify for employment as stenographer-secretaries, technical secretaries, and possibly as private secretaries. They are in demand where engineers and other technical personnel find a need for secretarial help who can understand the specialized language of Electrical, Mechanical, Civil, or Chemical Engineers. The duties of an engineering and technical secretary may consist of taking dictation and reports, meeting office callers and screening telephone calls, filing, and scheduling appointments. Graduates of this program, since they have received a background of science and engineering terminology in addition to their business background, are admirably prepared to work with engineering reports, records and correspondence.

SECRETARIAL — ENGINEERING AND TECHNICAL

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
T-ENG 101—Grammar and Composition	3	0	3
T-BUS 102—Typewriting (or Elective)	2	3	3
T-MAT 110—Business Mathematics	5	0	5
T-BUS 101—Introduction to Business	5	0	5
T-BUS 106—Shorthand (or Elective)	3	2	4
	18	5	20
SECOND QUARTER			
T-ENG 102—Grammar and Composition	3	0	3
T-BUS 103—Typewriting (or Elective)	2	3	3
T-BUS 107—Shorthand (or Elective)	3	2	4
T-BUS 120—Accounting	5	2	6
T-BUS 115—Business Law	3	0	3
	16	7	19
THIRD QUARTER			
T-ENG 204—Oral Communication	3	0	3
T-BUS 104—Typewriting	2	3	3
T-BUS 108—Shorthand	3	2	4
T-BUS 112—Filing	3	0	3
T-BUS 121—Accounting	5	2	6
	16	7	19
FOURTH QUARTER			
T-ENG 103—Report Writing	3	0	3
T-BUS 205—Advanced Typewriting	2	3	3
T-BUS 206—Dictation and Transcription (Technical)	3	2	4
T-BUS 110—Office Machines	2	2	3
T-EDP 104—Introduction to Data Processing Systems	3	2	4
	13	9	17
FIFTH QUARTER			
T-ENG 206—Business Communication	3	0	3
T-BUS 207—Dictation and Transcription (Technical)	3	3	4
T-BUS 214—Secretarial Procedures	3	2	4
T-DFT 104—Blueprint Reading: Mechanical	3	0	3
T-POL 201—U. S. Government	3	0	3
	15	5	17
SIXTH QUARTER			
T-BUS 272—Principles of Supervision	3	0	3
T-BUS 208—Dictation and Transcription (Technical)	3	2	4
T-BUS 271—Office Management	3	0	3
T-BUS 183—Terminology and Vocabulary (Technical)	3	0	3
T-PSY 206—Applied Psychology	3	0	3
T-SSC 206—American Institutions	3	0	3
	18	2	19

SECRETARIAL — ENGINEERING AND TECHNICAL

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

T-Eng 101—Grammar and Composition: Designed to aid the student in the improvement of self-expression in both writing and speaking. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English, grammar and written composition in their day to day situations.
Prerequisite: None

T-Bus 102—Typewriting: Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts.
Prerequisite: None

T-Mat 110—Business Mathematics: This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent uses of mathematics in the field of business.
Prerequisite: None

T-Bus 101—Introduction to Business: A survey of the business world with particular attention devoted to the structure of the various types of business organization, methods of financing, internal organization, and management.
Prerequisite: None

T-Bus 106—Shorthand: A beginning course in the theory and practice of reading and writing shorthand. Emphasis on phonetics, penmanship, word families, brief forms, and phrases.
Prerequisite: None

SECOND QUARTER

T-Eng 102—Grammar and Composition: A continuation of T-Eng 101, grammar and composition with emphasis on self-expression in business communications.
Prerequisite: T-Eng 101

T-Bus 103—Typewriting: Instruction emphasizes the development of speed and accuracy with further mastery of correct typewriting techniques. These skills and techniques are applied in tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 102 or the equivalent. Speed requirement, 30 words per minute for five minutes.

T-Bus 107—Shorthand: Continued study of theory with greater emphasis on dictation and elementary transcription.
Prerequisite: T-Bus 106 or the equivalent

T-Bus 120—Accounting: Principles, techniques and tools of accounting, for understanding of the mechanics of accounting. Collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: T-Mat 110

T-Bus 115—Business Law: A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, and agencies.
Prerequisite: None

THIRD QUARTER

T-Eng 204—Oral Communication: A study of basic concepts and principles of oral communications to enable the student to communicate with others. Em-

phasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentation. Particular attention given to conducting meetings, conferences, and interviews.
Prerequisite: None

T-Bus 104—Typewriting: Emphasis on production typing problems and speed building. Attention to the development of the student's ability to function as an expert typist, producing mailable copies. The production units are tabulation, manuscript, correspondence, and business forms.
Prerequisite: T-Bus 103 or the equivalent. Speed requirement, 40 words per minute for five minutes.

T-Bus 108—Shorthand: Theory and speed building. Introduction to office-style dictation. Emphasis on development of speed in dictation and accuracy in transcription.
Prerequisite: T-Bus 107

T-Bus 112—Filing: Fundamentals of indexing and filing, combining theory and practice by the use of miniature letters, filing boxes and guides. Alphabetic, Triple Check, Automatic, Geographic, Subject, Soundex, and Dewey Decimal filing.
Prerequisite: None

T-Bus 121—Accounting: Partnership and corporation accounting including a study of payrolls, federal and state taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: T-Bus 120

FOURTH QUARTER

T-Eng 103—Report Writing: The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum.
Prerequisite: None

T-Bus 205—Advanced Typewriting: Emphasis is placed on the development of individual production rates. The student learns the techniques needed in planning and in typing projects that closely approximate the work appropriate to the field of study. These projects include review of letter forms, methods of duplication, statistical tabulation, and the typing of reports, manuscripts and legal documents.
Prerequisite: T-Bus 104. Speed requirement, 50 words per minute for five minutes.

T-Bus 206—Dictation and Transcription: Develops the skill of taking dictation and of transcribing at the typewriter materials appropriate to the course of study, which includes a review of the theory and the dictation of familiar and unfamiliar material at varying rates of speed. Minimum dictation rate of 100 words per minute required for five minutes on new material.
Prerequisited: T-Bus 108

T-Bus 110—Office Machines: A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machines, full keyboard adding machines, and calculator.
Prerequisite: None

T-Edp 104—Introduction to Data Processing Systems: Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, a prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None

FIFTH QUARTER

T-Eng 206—Business Communication: Develops skills in techniques in writing business communications. Emphasis is placed on writing action — getting sales letters and prospectuses. Business reports, summaries of business conferences, letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry.
Prerequisite: T-Eng 102
T-Bus 207—Dictation and Transcription: Covering materials appropriate to the course of study, the student develops the accuracy, speed, and vocabulary that will enable her to meet the stenographic requirements of business and professional offices. Minimum dictation rate of 110 words per minute required for five minutes on new material.
Prerequisite: T-Bus 206
T-Bus 214—Secretarial Procedures: Designed to acquaint the student with the responsibilities encountered by a secretary during the work day. These include the following: receptionist duties, handling the mail, telephone techniques, travel information, telegrams, office records, purchasing of supplies, office organization, and insurance claims.
Prerequisite: None
T-Dft 104—Blueprint Reading: Mechanical: Interpretation and reading of blueprints. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes.
Prerequisite: None
T-Pol 201—United States Government: A study of government with emphasis on basic concepts, structure, powers, procedures and problems.
Prerequisite: None

SIXTH QUARTER

T-Bus 272—Principles of Supervision: Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None
T-Bus 208—Dictation and Transcription: Principally a speed building course, covering materials appropriate to the course of study, with emphasis on speed as well as accuracy. Minimum dictation rate of 120 words per minute required for five minutes on new material.
Prerequisite: T-Bus 207
T-Bus 271—Office Management: Presents the fundamental principles of office management. Emphasis on the role of office management including its functions, office automation, planning, controlling, organizing and actuating office problems.
Prerequisite: None
T-Bus 183—Terminology and Vocabulary: To develop an understanding of the terminology and vocabulary appropriate to the course of study, as it is used in business, technical, and professional offices.
Prerequisite: T-Bus 107
T-Psy 206—Applied Psychology: A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None
T-Ssc 206—American Institutions: A study of the effect of American social, economic, and political institutions upon the individual as a citizen and as a worker. The course dwells upon current local, national, and global problems viewed in the light of our political and economic heritage.
Prerequisite: None

TRADE DIVISION

TRADE DIVISION

In North Carolina as well as throughout the nation, the demand for skilled tradesmen is at an all-time high. Hardly a day passes that the Institute does not have at least one call from industry looking for prospective employees. Graduates of the trade programs sometimes have as many as four or five offers of employment upon graduation.

Students in the skilled trade programs are trained in shops similar to those of private industries. The shops contain testing and measuring instruments, tools, and equipment of the same size and types as found in private firms. The facilities make possible practical instruction which is essential to the preparation of skilled workers needed by today's modern industries. Students in these trade programs spend twenty-five to thirty hours per week in school; this time is divided between classroom studies and practice shop-work.

Skilled craftsmanship in the occupation, educational background and leadership ability are the basis for instructor selection in these trade courses.

A diploma is awarded to those students who satisfactorily complete the one-year (12 months) trade program. To be eligible for the diploma, a satisfactory passing grade must be maintained in all shop work and related class subjects. Certificates are issued to those who pass less than the whole course of study.

COURSES OFFERED

One year (12 months) training courses are offered in the following skilled trades:

Automotive Mechanics
Drafting, Mechanical
Heating, Refrigeration & Air-Conditioning
Machinist
Marine Diesel Mechanics
Operating Room Assistant (6 months)—Offered periodically
Practical Nursing
Radio & Television Servicing
Welding

ADMISSION REQUIREMENTS

1. Must be at least 18 years of age, or his high school class must have graduated.

2. Should be a high school graduate but must have completed at least eight (8) units of high school work — exceptions may be made for more mature adults who have been out of school for some time.

3. Must demonstrate aptitude for trade-vocational training as determined by standard tests. These tests will aid in student selection, placement, and guidance. Guidance and counseling will be available to the student throughout his education.

4. Must have sufficient mathematics to make success in the course of study likely.

5. Must be in acceptable condition of physical and mental health. Medical examination is required in some courses and may be required in others at the discretion of the Administration.

6. A personal interview is required.

ADMISSION PROCEDURE

1. Submit completed application.

2. Have transcripts of all previous education mailed to the Institute.

3. Satisfy admission test requirements.

4. Have doctor mail physical examination form to Institute if one is required.

5. Come to the school for personal interview and additional testing when asked to do so.

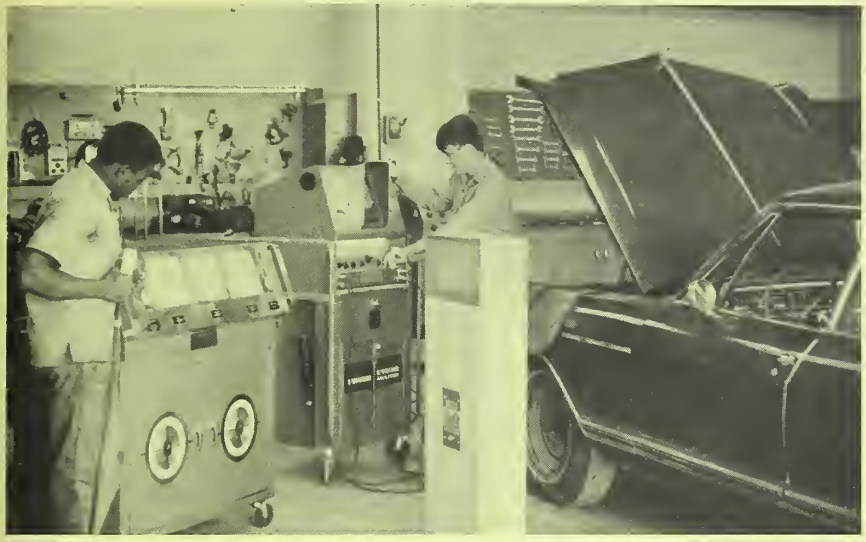
AUTOMOTIVE MECHANICS

This curriculum provides a training program for developing the basic knowledge and skills needed to inspect, diagnose, repair or adjust automotive vehicles. Manual skills are developed in practical shop-work. Thorough understanding of the operating principles involved in the modern automobile comes in class assignments, discussion, and shop practice.

Complexity in automotive vehicles increases each year because of scientific discovery and new engineering. These changes are reflected not only in passenger vehicles, but also in trucks, buses and a variety of gasoline-powered equipment. This curriculum provides a basis for the student to compare and adapt to new techniques for servicing and repair as vehicles are changed year by year.

Automobile mechanics maintain and repair mechanical, electrical, and body parts of passenger cars, trucks, and buses. In some communities and rural areas they also may service tractors or marine engines and other gasoline-powered equipment. Mechanics inspect and test to determine the cause of faulty operation. They repair or replace defective parts to restore the vehicle or machine to proper operating condition. They use shop manuals and other technical publications.

Automotive mechanics in smaller shops usually are general mechanics qualified to perform a variety of repair jobs. A large number of automobile mechanics specialize in particular types of repair work. For example, some may specialize in repairing only power steering and power brakes, or automatic transmissions. Usually such specialists have an all-round knowledge of automotive repair and may occasionally be called upon to do other types of work.



AUTOMOTIVE MECHANICS

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
PME 1101—Internal Combustion Engines	3	15	8
MAT 1101—Applied Mathematics	5	0	5
ENG 1101—Reading Improvement	2	0	2
PHY 1101—Applied Science	2	3	3
	12	18	18
SECOND QUARTER			
PME 1102—Engine Electrical and Fuel Systems	5	15	10
ENG 1102—Communication Skills	2	0	2
AUT 1126—Schematics & Diagrams: Automotive	0	3	1
PHY 1102—Applied Science	2	3	3
	9	21	16
THIRD QUARTER			
AUT 1120—Automotive Analysis	3	6	5
AUT 1123—Auto. Chassis & Suspension Systems	3	9	6
AUT 1121—Braking Systems	3	3	4
PSY 1101—Human Relations	3	0	3
	12	18	18
FOURTH QUARTER			
AUT 1124—Automotive Power-Train Systems	3	9	6
AUT 1125—Automotive Servicing	3	9	6
BUS 1103—Small Business Operations	3	0	3
WLD 1101—Basic Welding	0	3	1
	9	21	16

AUTOMOTIVE MECHANICS

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Pme 1101—Internal Combustion Engine: Development of a thorough knowledge and ability in using, maintaining, and storing the various hand tools and measuring devices needed in engine repair work. Study of the construction and operation of components of internal combustion engines. Testing of engine performance servicing and maintenance of pistons, valves, cams and camshafts, fuel and exhaust systems, cooling systems; proper lubrication, and methods of testing, diagnosing and repairing.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion.
Prerequisite: None

Eng 1101—Reading Improvement: Designed to improve the student's ability to read rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition and to train for comprehension in larger units.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

SECOND QUARTER

Pme 1102—Engine Electrical and Fuel Systems: A thorough study of the electrical and fuel systems of the automobile. Battery cranking mechanism, generator, ignition, accessories and wiring; fuel pumps, carburetors, and fuel injectors. Characteristics of fuels, types of fuel systems, special tools, and testing equipment for the fuel and electrical system.
Prerequisite: Pme 1101

Eng 1102—Communication Skills: Designed to promote effective communication through correct language usage in speaking and writing.
Prerequisite: Eng 1101

Aut 1126—Schematics & Diagrams: Automotive: Interpretation and reading of manufacturing diagrams. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes.
Prerequisite: None

Phy 1102—Applied Science: The second in a series of two courses of applied physical principles. Topics introduced in this course are heat and thermometry, and principles of force, motion, work, energy, and power.
Prerequisite: Phy 1101

THIRD QUARTER

Aut 1120—Automotive Analysis: Complete engine operation analysis through the use of electronic equipment. Students will be trained on the various electronic equipment to analyze exhaust fumes, etc. for proper trouble shooting diagnosis. Equipment used will be similar to that used by the Automotive Repair Garages. Students will learn the proper steps to be followed in trouble shooting analysis of an automotive engine, brakes, steering, elec. circuit, drive lines.

Aut 1123—Automotive Chassis and Suspension Systems: Principles and functions of the components of automotive chassis. Practical job instruction in adjusting and repairing of suspension, and steering systems. Units to be studied will be shock absorbers, springs, steering systems, steering linkage, and front end and alignment.
Prerequisite: Pme 1102

Aut 1121—Braking Systems: A complete study of various braking systems employed on automobiles and lightweight trucks. Emphasis is placed on how they operate, proper adjustment, and repair.
Prerequisite: Phy 1102

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.
Prerequisite: None

FOURTH QUARTER

Aut 1124—Automotive Power Train Systems: Principles and functions of automotive power train systems: clutches, transmission gears, torque converters, drive shaft assemblies, rear axles and differentials. Identification of troubles, servicing, and repair.
Prerequisites: Phy 1102, Aut 1123

Aut 1125—Automotive Servicing: Emphasis is on the shop procedures necessary in determining the nature of troubles developing in the various component systems of the automobile. Troubleshooting of automotive systems, providing a full range of experiences in testing, adjusting, repairing and replacing.
Prerequisites: Aut 1123, Aut 1121, Ahr 1101

Bus 1103—Small Business Operations: An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None

Wld 1101—Basic Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

DRAFTING — MECHANICAL

This curriculum is designed to prepare students to enter the field of mechanical drafting. The first two quarters contain courses basic to all fields of drafting. The third and fourth quarters contain specialization and related courses that prepare one to enter mechanical drafting occupations.

Each course is prepared to enable an individual to advance rapidly in drafting proficiency upon entering the field of work. Courses are arranged in sequence to develop drafting skills and proficiency in mathematics and science. The draftsman associates with many levels of personnel — administrative, architects, engineers, skilled workmen — and must be able to communicate effectively with them. Courses to develop knowledge and skills in communication, human relations, economics and industrial organization are provided to assist the student in developing understanding and confidence in his relations with other persons.

A draftsman prepares clear, complete, and accurate working plans and detail drawings, from rough or detailed sketches or notes for engineering or manufacturing purposes, according to the specified dimensions: makes final sketch of the proposed drawing, checking dimension of parts, materials to be used, the relation of one part to another, and the relation of the various parts to the whole structure. Makes any adjustments or changes necessary or desired. Inks in lines and letters on pencil drawings as required. Exercises manual skill in the manipulation of triangle, T-square, and other drafting tools. Lays tracing paper on drawing and traces drawing in pencil or ink. Makes charts for representation of statistical data. Makes finished designs from sketches. Utilizes knowledge of various machines, engineering practices, mathematics, building materials, and other physical sciences to complete the drawings.

A mechanical draftsman performs the general duties of a draftsman and also specializes in making rough drafting sketches of proposed mechanical devices, and then drawing necessary details. Prepares accurate drawings of parts or machines from specifications.

DRAFTING — MECHANICAL

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
DFT 1121—Drafting	3	15	8
MAT 1101—Applied Mathematics	5	0	5
ENG 1101—Reading Improvement	2	0	2
PHY 1101—Applied Science	2	3	3
	12	18	18
SECOND QUARTER			
DFT 1122—Drafting	3	11	7
DFT 1125—Descriptive Geometry	1	3	2
MAT 1102—Applied Mathematics	5	0	5
ENG 1102—Communication Skills	2	0	2
PHY 1102—Applied Science	2	3	3
	13	17	19
THIRD QUARTER			
DFT 1131—Mechanical Drafting	3	12	7
MAT 1104—Trigonometry	3	0	3
PSY 1101—Human Relations	3	0	3
MEC 1113—Shop Processes	1	3	2
MEC 1115—Applied Metallurgy	2	3	3
	12	18	18
FOURTH QUARTER			
DFT 1132—Mechanical Drafting	3	12	7
MEC 1114—Shop Processes	1	3	2
MEC 1116—Applied Metallurgy	2	3	3
BUS 1105—Industrial Organization	3	0	3
MAT 1124—Slide Rule	3	0	3
	12	18	18

DRAFTING — MECHANICAL

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Dft 1121—Drafting: An introduction to drafting and the study of drafting practices. Instruction is given in the selection, use and care of instruments, singlestroke lettering, applied geometry, freehand sketching consisting of orthographic and pictorial drawings. Orthographic projection, reading and instrument drawing of principal views, single auxiliary views (primary), and double (oblique) auxiliary views will be emphasized. Dimensioning and note practices will be studied with reference to the American Standards Association practices. Methods of reproducing drawings will be included at the appropriate time.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Eng 1101—Reading Improvement: Designed to improve the student's ability to read rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition and to train for comprehension in larger units.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement: properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

SECOND QUARTER

Dft 1122—Drafting: The trainee will study simple and successive revolutions and their applications to practical problems. Sections and conventions will be studied and both detail and assembly sections will be drawn. Intersections and developments will be studied by relating the drawing to the sheet metal trades. Models of the assigned drawings will be made from construction paper, cardboard, or similar materials as a proof of the solution to the problems drawn. Methods of drawing and projected axonometric, oblique, and perspective drawings will be studied with emphasis on the practical applications of pictorial drawings. Various methods of shading will be introduced and dimensioning and sectioning of oblique and axonometric pictorials will be done.
Prerequisite: Dft 1121

Dft 1125—Descriptive Geometry: Graphical analysis of space problems. The problems deal with practical design elements involving points, lines, planes, connectors, and a combination of these. Included are problems dealing with solid geometry theorems. Where applicable, each graphical solution shall be accompanied by the analytical solution.
Prerequisite: Dft 1121

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.

Eng 1102—Communication Skills: Designed to promote effective communication through correct language usage in speaking and writing.
Prerequisite: Eng 1101

Phy 1102—Applied Science: The second in a series of two courses of applied physical principles. Topics introduced in this course are heat and thermometry, and principles of force, motion, work, energy, and power.
Prerequisite: Phy 1101

THIRD QUARTER

Dft 1131—Mechanical Drafting: An introduction to mechanical drafting beginning with problems concerning precision and limit dimensioning. Methods of fastening materials, and fasteners: keys, rivets, springs, and welding. Symbols will be studied and drawings will be made involving these items. Principles of design will be introduced with the study of basic mechanisms of motion transfer; gears, cams, power trains, pulleys, belting and methods of specifying and calculating dimensions will be studied. Drawings will be made involving these mechanisms.
Prerequisite: Dft 1122

Mat 1104—Trigonometry: Trigonometric ratios; solving problems with right triangles, using tables, and interpolating; solution of oblique triangles using law of sines and law of cosines; graphs of the trigonometric functions; inverse functions, trigonometric equations. All topics are applied in practical problems.
Prerequisites: Mat 1101, Mat 1102

Psy 1101—Human Relations: Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None

Mec 1113—Shop Processes: Study of practices used in metalworking shops: introduction to how materials can be utilized, and to the processes of shaping, forming and fabricating of metals. Demonstration of the metalworking lathes, grinders, drills, milling machines, shapers, planers, saws, broachers, gear-cutting machines and finishing machines. A study of the capabilities of these machines.
Prerequisite: None

Mec 1115—Applied Metallurgy: Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals, producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study.
Prerequisite: None

FOURTH QUARTER

Dft 1132—Mechanical Drafting: Principles of design sketching, design drawings, layout drafting, detailing from layout drawings, production drawings and simplified drafting practices constitute areas of study. Forging and casting drawings will be made from layouts. Specifications, parts list and bill of materials are emphasized in this course. The student will develop a complete set of working drawings of a tool, jig, fixture or simple machine and learn principles of design, handbook and manual usage.
Prerequisite: Dft 1131

Mec 1114—Shop Processes: Comparison of the unit-production and mass-production systems. Casting, forging and allied processes, welding and sheet metal working processes are demonstrated and discussed. Mass-production methods are studied in relationship to precision dimensional control.
Prerequisite: Mec 1113

Mec 1116—Applied Metallurgy: Continuation of the study of physical metallurgy. The non-ferrous metals; bearing metals (brass, bronze, lead), light metals (aluminum and magnesium) and copper and its alloys are studied. Powder metallurgy, titanium, zirconium, indium and vanadium are included in this course.
Prerequisite: Mec 1115

Bus 1105—Industrial Organizations: Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None

Mat 1124—Slide Rule: An introductory slide rule course starting with multiplication and division going into more complicated mathematics. Students will also master the use of a slide rule in calculating squares and square roots, cubes and cube roots, and reciprocals.

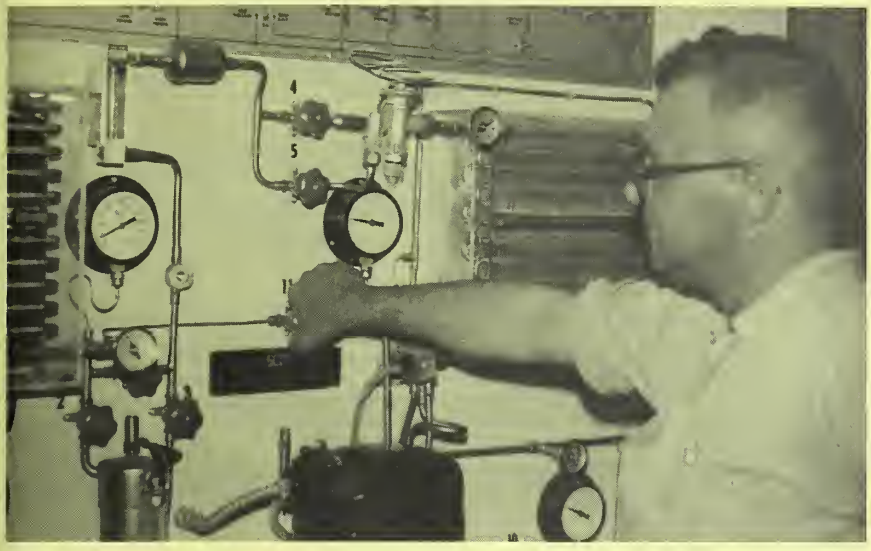
HEATING, REFRIGERATION & AIR-CONDITIONING

Through this curriculum the Cape Fear Technical Institute provides a training program for the instruction of students in the basic knowledges and skills involved in servicing and installing heating, air-conditioning and refrigeration equipment. Manual skills are emphasized in practical shop work combined with a thorough understanding of the operating principles involved in heating, air-conditioning and refrigeration.

The heating, air-conditioning and refrigeration industry is one of the fastest growing fields today. With the ever-increasing use of air-conditioning in industries and the even faster growing use of air-conditioning and heating system in domestic use, the need for service people to install and maintain this equipment has surpassed the available supply of trained personnel. This need for trained people has become so great that a program for training is necessary. Because of the increasing engineering complexity caused by the demand for more efficient, more compact, and dual capacity units, this curriculum to train people and to upgrade present-day servicemen has been prepared.

In North Carolina a contractor in the heating, air-conditioning and refrigeration field is required by law to hold a state license if his work is done in cities of over 10,000 population. The serviceman or mechanic is not required to hold a license. The material presented herein is basic to the passing of this state's license examination. With job experience, a graduate should be able to successfully pass the examination and acquire a contractor's license.

The heating, air-conditioning and refrigeration mechanic installs, services and repairs equipment used in the heating and cooling of domestic buildings, industrial buildings and mobile-type units. In general, a person will perform similar duties in any one of these fields, but often becomes a specialist in one. The mechanic uses blueprints and schematics, thus requiring a knowledge of blueprint reading. He services, installs and maintains commercial and domestic refrigeration components, heating devices, air and liquid flow devices used in comfort heating of air and liquids, and fuel storage units. The duties may involve mechanical repairs, electrical motor repairs, control wiring, electrical and gas tests, pipe and tubing fitting, duct and fitting fabrication, equipment installation, shop sketching of equipment and flow devices for installations, and equipment sizing.



HEATING, REFRIGERATION & AIR-CONDITIONING

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
AHR 1116—Oil Burner Installation and Service	4	6	6
MAT 1101—Applied Mathematics	5	0	5
PHY 1101—Applied Science	3	0	3
DFT 1104—Blueprint Reading	0	2	1
AHR 1120—Principles of Refrigeration	3	2	4
	15	10	19
SECOND QUARTER			
AHR 1117—Gas Burners, Electric Heat & Liquid Heat Applications	4	3	5
AHR 1121—Principles of Refrigeration	3	6	4
ELC 1101—Applied Electricity	2	0	2
DFT 1116—Applied Drafting	2	2	3
WLD 1102—Basic Gas Welding	0	3	1
	11	14	15
THIRD QUARTER			
AHR 1122—Commercial Refrigeration	3	8	6
ELC 1102—Applied Electricity	1	2	2
AHR 1123—Principles of Air Conditioning	2	4	4
MAT 1115—Electrical Mathematics	5	0	5
	11	14	17
FOURTH QUARTER			
AHR 1126—All Year Comfort Systems	3	9	6
AHR 1109—Job Planning and Estimating	2	0	2
PSY 1101—Human Relations	2	0	2
AHR 1128—Automatic Controls	3	6	5
	10	15	15

HEATING, REFRIGERATION & AIR-CONDITIONING

COURSE DESCRIPTION BY QUARTERS

FIRST QUARTER

Ahr 1116—Oil Burner Installation and Service: An introduction to the principle of heating, terminology, and the use and repair of equipment. Also included will be maintenance and service of heating units and diagnosing troubles within installation. Temperature and thermostat controls are also a part of this course.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

Dft 1104—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

Ahr 1120—Principles of Refrigeration: An introduction to the principles of refrigeration, terminology, the use and care of tools and equipment, and the identification and the function of the component parts of a system. Other topics to be included will be the basic laws of refrigeration; characteristics, and comparison of the various refrigerants; the use and construction of valves, fittings, and basic controls. Practical work includes tube bending, flaring and soldering. Standard procedures and safety measures are stressed in the use of special refrigeration service equipment and the handling of refrigerants.
Prerequisite: None

SECOND QUARTER

Ahr 1117—Gas Burners, Electric Heat and Liquid Heat Applications: An introduction to the principles of heating with the use of gas, electric, or liquid heat units. The course includes installation in service to the above forms of heating units. The course will also include servicing and corrective maintenance techniques as it applies to the above three forms of heating units.
Prerequisite: None

Ahr 1121—Principles of Refrigeration: A continuation and more advanced study in refrigeration principles.
Prerequisite: AHR 1120

Elc 1101—Applied Electricity: The use and care of test instruments and equipment used in servicing electrical apparatus for air conditioning and refrigeration installations. Electrical principles and procedures for trouble-shooting of the various electrical devices used in air conditioning, heating, and refrigeration equipment. Included will be transformers, various types of motors and starting devices, switches, electrical heating devices and wiring.
Prerequisite: None

Dft 1116—Applied Drafting: The teaching of fundamentals, sketching and drawing as may be found in the heating, refrigeration, and air conditioning trades. Course will include some drawings of electrical circuits, heating controls and elements, refrigeration controls, and similar drawings as may be seen on blueprints related to these trades.
Prerequisite: None

Wld 1102—Basic Gas Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

THIRD QUARTER

Ahr 1122—Commercial Refrigeration: Commercial refrigeration servicing of conventional, hermetic, and absorption systems. Cabinet care, controls, and system maintenance in refrigerators, freezers, and window air conditioning units is stressed. Commercial refrigeration servicing of display cabinets, walk-in cooler and freezer units, and mobile refrigeration systems is studied. The use of manufacturers' catalogs in sizing and matching system components and a study of controls, refrigerants, servicing methods is made. The American Standard Safety Code for refrigeration is studied and its principles practiced.
Prerequisite: Ahr 1121

Elc 1102—Applied Electricity: The use and care of test instruments and equipment used in servicing electrical apparatus for air conditioning and refrigeration installations. Electrical principles and procedures for trouble-shooting of the various electrical devices used in air conditioning, heating, and refrigeration equipment. Included will be transformers, various types of motors and starting devices, switches, electrical heating devices and wiring.
Prerequisite: Elc 1101

Ahr 1123—Principles of Air-Conditioning: Work includes the selection of various heating, cooling and ventilating systems, investigation and control of factors affecting air cleaning, movement, temperature, and humidity. Use is made of psychrometric charts in determining needs to produce optimum temperature and humidity control. Commercial air conditioning equipment is assembled and tested. Practical sizing and balancing of ductwork is performed as needed.
Prerequisite: Ahr 1121

Mat 1115—Electrical Mathematics: An introductory algebra course with trigonometry and vectors needed in alternating current: algebraic operations of addition, subtraction, multiplication and division; use of letters and signs, grouping, factoring; exponents, ratios and proportions; algebraic and graphic solutions of first-degree equations; introduction to trigonometric functions, their graphs and applications to right triangles. Addition, subtraction and resolution of vector quantities.
Prerequisite: None

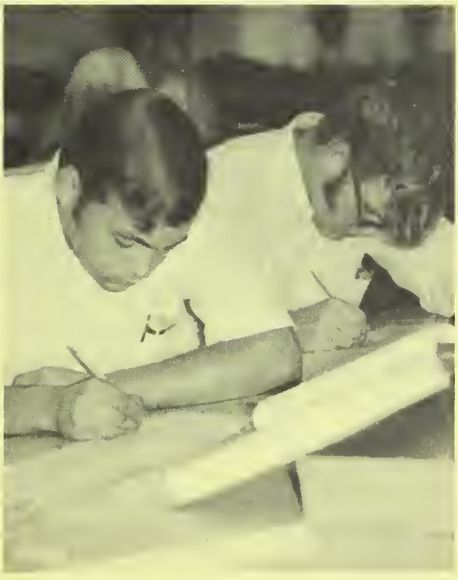
FOURTH QUARTER

Ahr 1126—All Year Comfort Systems: Auxiliary equipment used in conjunction with refrigeration systems to provide both heating and cooling for "all year" comfort will be studied and set up in the laboratory. Included will be oil fired systems, gas fired systems, water circulating systems, and electric-resistance systems. Installation of heat pumps will be studied along with servicing techniques. Reversing valves, special types of thermostatic expansion valves, systems of de-icing coils, and electric wiring and controls are included in the study.
Prerequisite: Ahr 1123

Ahr 1109—Job Planning and Estimating: Estimating loads and capacity of refrigeration and cooling units through the use of manuals, tables, and charts. Students will be expected to acquire sufficient knowledge to determine and recommend the adequat sizing of refrigeration and cooling units for specific uses either in homes or industry.
Prerequisite: Mat 1101

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationship within the work situation.
Prerequisite: None

Ahr 1128—Automatic Controls: The study of various control thermostat systems used by manufacturers for the installation of their equipment. This course includes resetting and calibrating of control units used on the various heating systems. The principles of how these controls work is also discussed and covered during the lecture portion of this course.



MACHINIST

This curriculum was prepared to meet a definite need for training of machinists. Surveys recently completed in North Carolina show that many of the existing industries lack time and facilities for training enough machinists to meet present and planned needs. Expanding industries already located in our State and new industries under development invariably express the need for skilled craftsmen who have the background knowledge and potential to advance.

This guide is designed to give learners the opportunity to acquire basic skills and the related technical information necessary to gain employment and build a profitable career in the machine shop industry in the State. It is comprised of the joint views of committees responsible for its development.

The machinist is a skilled metal worker who shapes metal parts by using machine tools and hand tools. His training and experience enable him to plan and carry through all the operations needed in turning out a machined product and to switch readily from one kind of product to another. A machinist is able to select the proper tools and material required for each job and to plan the cutting and finishing operations in their proper order so that he can complete the finished work according to blueprint or written specifications. He makes standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining. He often uses precision measuring instruments such as micrometers and gauges to measure the accuracy of his work to thousandths of an inch.

This skilled worker must be able to set up and operate most types of machine tools. The machinist also must know the composition of metals so that he can heat and quench cutting tools and parts to improve machinability. His wide knowledge enables him to turn a block of metal into an intricate, precise part.

MACHINIST

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
MEC 1101—Machine Shop Theory & Practice	3	15	8
ENG 1101—Reading Improvement	2	0	2
MAT 1101—Applied Mathematics	5	0	5
DFT 1104—Blueprint Reading	2	3	3
	12	18	18
SECOND QUARTER			
MEC 1102—Machine Shop Theory & Practice	3	15	8
MAT 1102—Applied Mathematics	5	0	5
DFT 1105—Blueprint Reading	0	3	1
WLD 1101—Basic Welding	1	3	2
	9	21	16
THIRD QUARTER			
MEC 1103—Machine Shop Theory & Practice	2	18	8
MAT 1106—Applied Mathematics	3	0	3
DFT 1106—Blueprint Reading	0	3	1
MEC 1115—Applied Metallurgy	2	0	2
ENG 1102—Communication Skills	2	0	2
	9	21	16
FOURTH QUARTER			
MEC 1104—Machine Shop Theory & Practice	2	15	7
MEC 1116—Applied Metallurgy	0	3	1
MAT 1123—Machinist Mathematics	5	0	5
PHY 1101—Applied Science	2	3	3
	9	21	16

MACHINIST

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Mec 1101—Machine Shop Theory and Practice: An introduction to the machinist trade and the potential it holds for craftsmen. Deals primarily with the identification, care and use of basic hand tools and precision-measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: None

Eng 1101—Reading Improvement: Designed to improve the student's ability to read rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition and to train for comprehension in larger units.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Dft 1104—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

SECOND QUARTER

Mec 1102—Machine Shop Theory and Practice: Advances operations in layout tools and procedures, power sawing, drill press, surface grinder, milling machine shaper. The student will be introduced to the basic operations on the cylindrical grinder and will select projects encompassing all the operations, tools and procedures thus far used and those to be stressed throughout the course.
Prerequisite: Mec 1101

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: Mat 1101

Dft 1105—Blueprint Reading: Further practice in interpretation of blueprints as they are used in industry; study of prints supplied by industry; making plans of operations; introduction to drafting room procedures; sketching as a means of passing on ideas, information and processes.
Prerequisite: Dft 1104

Wld 1101—Basic Welding: Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding, bronze welding, silver soldering, and flame-cutting methods applicable to mechanical repair work.
Prerequisite: None

THIRD QUARTER

Mec 1103—Machine Shop Theory and Practice: Advanced work on the engine lathe, turning, boring and threading machines, grinders, milling machine and shaper. Introduction to basic indexing and terminology with additional processes on calculating, cutting and measuring of spur, helical, and worm gears and wheels. The trainee will use precision tools and measuring instruments such as vernier height gages, protractors, comparators, etc. Basic exercises will be given on the turret lathe and on the tool and cutter grinder.
Prerequisite: Mec 1102

Mat 1106—Applied Mathematics: A continuation of Mat 1102 with the addition of fundamental formulas and equations dealing in areas of plane figures and volumes of solids. Geometric principles will be applied to shop operations.
Prerequisite: Mat 1102

Dft 1106—Blueprint Reading: Advanced blueprint reading and sketching as related to detail and assembly drawings used in machine shops. The interpretation of drawing of complex parts and mechanisms for features of fabrication, construction and assembly.
Prerequisite: Dft 1105

Mec 1115—Applied Metallurgy: Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study.
Prerequisite: None

Eng 1102—Communication Skills: Designed to promote effective communication through correct language usage in speaking and writing.
Prerequisite: Eng 1101

FOURTH QUARTER

Mec 1104—Machine Shop Theory and Practice: Development of class projects using previously learned procedures in planning, blueprint reading, machine operations, final assembly and inspection. Additional processes on the turret lathe, tool and cutter grinder, cylindrical and surface grinder, advanced milling machine operations, etc. Special procedures and operations, processes and equipment, observing safety procedures faithfully and establishing of good work habits and attitudes acceptable to the industry.
Prerequisite: Mec 1103

Mec 1116—Applied Metallurgy: Continuation of the study of physical metallurgy. The non-ferrous metals: bearing metals (brass, bronze, lead), light metals (aluminum and magnesium), and copper and its alloys are studied. Powder metallurgy, titanium, zirconium, indium and vanadium are included in this course.
Prerequisite: Mec 1115

Mat 1123—Machinist Mathematics: Introduces gear ratio, lead screw and indexing problems with emphasis on application to the machine shop. Practical applications and problems furnish the trainee with experience in geometric propositions and trigonometric relations to shop problems; concludes with an introduction to compound angle problems.
Prerequisite: Mat 1106

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

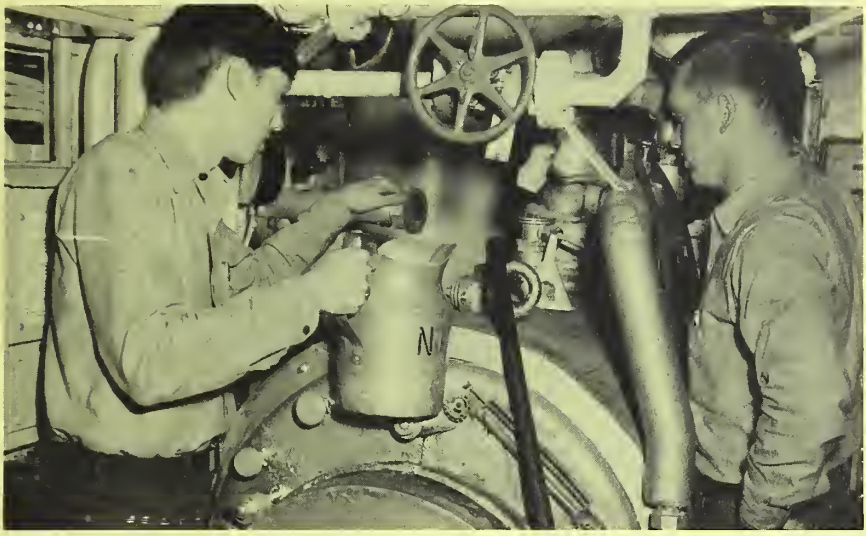
MARINE DIESEL MECHANICS

Marine mechanics are in demand along the coastal waterways of North Carolina and other states where fishing and water recreation industries exist. This is a rapidly growing industry in many areas of the country. Single boat operations to large fleets exist for sport and commercial fishing and various recreational activities. These boats use propulsion systems ranging from one cylinder motors to large diesel units. These units require trained and skilled mechanics to maintain and service them for proper operation.

This program provides training for individuals interested in becoming mechanics to service and maintain the propulsion system for boats and various types of marine equipment. Manual skills in servicing marine equipment are developed in practical shop work. A thorough understanding of the operating principles of this equipment is provided through classroom instruction, laboratory experiments, group discussions and shop practice.

Marine engine mechanics maintain and repair mechanical, electrical, hydraulic, and pneumatic equipment used on boats and in industrial applications. Mechanics inspect and test to determine the causes of faulty operation; repair or replace defective parts to restore the machine or unit to proper operating condition; use shop manuals, manufacturer's maintenance manuals, and other technical publications.

Marine engine mechanics in smaller shops or self-employed persons usually are general mechanics qualified to perform a variety of repair jobs. A large number of marine engine mechanics specialize in particular types of repair work. For example, some may specialize in repairing only electrical equipment, or injector's servicing. Others specialize in clutches and power train equipment. Usually such specialists have an all-round knowledge of marine engine operation and may occasionally be called upon to do other types of work.



MARINE DIESEL MECHANICS

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
MDE 1101—Marine Diesel Eng. Theory & Practice	5	10	8
MAT 1101—Applied Mathematics	5	0	5
PHY 1104—Applied Physics I	1	2	2
MEC 1121—Machine Shop Theory and Practice	2	3	3
ENG 1101—Reading Improvement	2	0	2
	15	15	20
SECOND QUARTER			
MDE 1102—Marine Diesel Eng. Theory & Practice	6	10	9
MAT 1123—Machinist Mathematics	5	0	5
ELC 1101—Marine Electricity	1	3	2
DFT 1104—Blueprint Reading	0	3	1
ENG 1102—Communication Skills	2	0	2
	14	16	19
THIRD QUARTER			
MDE 1103—Marine Diesel Eng. Theory & Practice	5	12	9
ELC 1102—Marine Electricity	1	3	2
WLD 1101—Basic Welding	1	3	2
SS 1101—Safety at Sea	1	2	2
PSY 1101—Human Relations	2	0	2
	10	20	17
FOURTH QUARTER			
MDE 1104—Marine Diesel Eng. Theory & Practice	5	12	9
ELC 1103—Marine Electricity	1	3	2
MEC 1122—Machine Shop Theory and Practice	0	6	2
BUS 1105—Industrial Organizations	3	0	3
	9	21	16

MARINE DIESEL MECHANICS

SUGGESTED CURRICULUM BY QUARTERS

FIRST QUARTER

Mds 1101—Marine Diesel Engines Theory & Practice: Principles of main propulsion of vessels employing internal combustion engines. Construction and various designs of the operational principles of two- and four-cycle internal combustion engines and their delated piping systems, cooling, fueling and lubrication. Study of the power train componants, clutch, reduction gears, reverse gears, coupling, line shafting, and propellors. Precedures for "lighting off" operation, testing and recording engine performance, and servicing in a planned preventative manitenance program through periodic and recorded inspections. Principles of ventilation and heating of vessels, and the basic principles of steam generation where such method is employed as a medium of heating for comfort as well as providing fresh water.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Phy 1104—Applied Physics I: Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, and gases.
Prerequisite: None

Mec 1121—Machine Shop Theory and Practice: An introduction to the machinist trade and the potential it holds for the craftsman. Deals primarily with the identification, care and use of basic hand tools and precision measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinder (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: None

Eng 1101—Reading Improvement: A concentrated effort to improve the student's ability to comprehend what he reads by training him to read more rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition, and to train for comprehension in larger units. Reading faults of the individual are analyzed for improvement, and principles of vocabulary building are stressed.
Prerequisite: None

SECOND QUARTER

Mde 1102—Marine Diesel Engines Theory and Practice: Diesel engines and related auxiliaries and their relationship to the engineering plant and their application for operating various shipboard systems. Theory of filling, storage, purification, transfer of fuels, lubricants, water, and study of the various piping systems and their maintenance. Operation of pumps for fire system, drainage, main and secondary, and of their importance in maintaining stability and trim of the vessel.
Prerequisite: Mde 1101

Mat 1123—Machinist Mathematics: Fundamental geometric concepts and construction of plane and solid figures, surface and volume measurements, and related problems; introduction to the right triangle. Introduces gear ratio, lead screw and indexing problems with emphasis on application to the machine shop. Practical applictioans and trigonometric relations to shop problems; concludes with an introduction to compound angle problems.
Prerequisite: Mat 1101

Elc 1101—Marine Electricity: Origin and history of electricity, and the fundamental concepts underlying the various types of electrical marine installations. Methods of production and generation, and the study of the construction of generators and their design which are employed in the production of direct and alternating current. Practical application of acquired knowledge and methods applicable to shipboard electrical systems, namely power, lighting, and interior communications involving a variety of units which embraces the generators, switchboards, power distribution panels, transformers and cables. Methods of identifying cable markings by color code to the various power feeder systems, for the purpose of repairs and maintenance. Study of motor control equipment and its application and relation to the various systems.
Prerequisite: None

Dft 1104—Blueprint Reading:: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

Eng 1102—Communication Skills: Development of ability to communicate effectively through the medium of good language usage in speaking and writing. Organizing thoughts, and presenting thoughts effectively in connection with problems.
Prerequisite: None

THIRD QUARTER

Mde 1103—Marine Diesel Engines Theory and Practice: Principles of operation of diesel generator plants and their application and operation in the production of electrical power for propulsion, steerage, internal communications, deck machinery, refrigerating plants, and the production of fresh water employing the electrical vapor distilling process of evaporation.
Prerequisites: Mde 1101 and 1102

Elc 1102—Marine Electricity: Principles and procedures in the use of electrical indicating instruments in the control, and accurate quantitative measurement of current flow in shipboard electrical installations, including the ammeters, voltmeters, ohmeters, and electron tube analyzers. Additional techniques will be developed to conduct and record megger tests, and tactical training in th employment of the watt-meters, power factor meters, synchroscopes, and capacitance-resistance-inductance bridges.
Prerequisite: Elc 1101

Wld 1101—Basic Welding—Welding demonstrations by the instructor and practice by students in the welding shop. Metallurgy of welding discussed. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding and flame cutting. Emphasis on electric arc and gas welding methods applicable to mechanical repair work. Brazing also covered.

Ss 1101—Safety at Sea: Consists not only of medical first aid, but also various life-saving drills held aboard ship, i.e. life-boat drill, fire-fighting drills, man overboard, etc. The fundamentals of anatomy and physiology are covered to enable the students to understand medical first aid basics such as compression points for the application of tourniquets for stopping the flow of blood. A comprehensive study of the symptoms and treatment of diseases are discussed. How to tend and nurse patients at sea, how to maintain a ship's hospital, and an understanding of the use of all the first aid equipment carried in the ship's medicine locker. Methods used to attain a high degree of ship sanitation. This includes handling of food, preparation of food, storage of food, upkeep of toilets and living quarters, disposal of garbage and other wastes, and control of vermin and other disease-carrying pests. The importance of excellent standards of personal hygiene aboard ship. A practical study of various resuscitation equipment, oxygen-breathing apparatus, smoke masks, safety slings and stretchers.

The rigging and use of the breeches buoy. Life boat, life raft equipment and its use. Understanding of storm signals, distress signals and what to do to make the ship seaworthy in order to weather a severe storm. Fire hazards and fire prevention, safety rules working around machinery, general rules and regulations as prescribed by the United States Bureau of Customs, the U. S. Immigration Laws and the U. S. Coast Guard.
Prerequisite: None

Psy 1101—Human Relations: Development of understanding of relationships to other persons through some of the basic principles of human psychology. The problems of the individual and his work situation are studied in relation to the established organization of modern business and industry and in relation to government practices and labor organization, with special emphasis on the operating responsibilities of good management.
Prerequisite: None

FOURTH QUARTER

Mde 1104—Marine Diesel Engines Theory and Practice: The administration of Marine Engineering plants, through the recording and filing of performance data. Processing recording and storage of parts for the preventative maintenance program, and periodic inspections of machinery and component parts through the use of precision tools to determine conditions due to wear, and the replacement of such components in conformance with recommended standards set forth by the manufacturer.
Prerequisites: Mde 1101, 1102 and 1103

Elc 1103—Marine Electricity: Electrical terms and formulas, and identification of various systems in shipboard operations, degaussing system, sonar system, loran system and alarm systems, and the methods of trouble shooting, prevention of electrical shock, fire and harmful gases which may be use of portable electrical equipment, and the use of chemicals and equipment when repairing and maintaining shipboard electrical installations.
Prerequisite: Elc 1102

Mec 1122—Machine Shop Theory and Practice: An introduction to the machinist trade and the potential it holds for the craftsman. Deals primarily with the identification, care and use of basic hand tools and precision measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: Mec 1121

Bus 1105—Industrial Organization: Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None

PRACTICAL NURSE EDUCATION

The accelerated growth of population in North Carolina and rapid advancement in medical technology demand an increased number of well-trained personnel for health services. Realizing this need, the State Department of Community Colleges, in conjunction with local hospitals, administers programs of practical nurse education in local systems, community colleges, technical institutes and in industrial education centers throughout the state.

The aim of the Practical Nurse Education Program is to make available to qualified persons the opportunity to prepare for participation in care of patients of all ages, in various states of dependency, and with a variety of illness conditions.

Students are selected on the basis of demonstrated aptitude for nursing as determined by pre-entrance tests, interviews with faculty members, high school record (students in this program must be a high school graduate or the equivalent*), characters references, and reports of medical and dental examination.

Throughout the one-year program the student is expected to grow continuously in acquisition of knowledge and understanding related to nursing, the biological sciences, the social sciences and in skills related to nursing practice, communications, interpersonal relations, and use of good judgment. Evaluation of student performance consists of tests on all phases of course content, evaluation of clinical performance, and evaluation of adjustment to the responsibilities of nursing. A passing score is required on all graded work, plus demonstrated progress in application of nursing skills to actual patient care.

Graduates of accredited programs of practical nurse education are eligible to take the licensing examination given by the North Carolina Board of Nursing. This examination is given twice each year, usually in April and September. A passing score entitles the individual to receive a license and to use a legal title "Licensed Practical Nurse." The license must be renewed annually. The Licensed Practical Nurse can apply for licensure in other states on the basis of a satisfactory examination score, without repeating the examination.

*See page 122 in General Adult Education Section for details about the high school equivalency certificate.

The LPN is prepared to function in a variety of situations: hospitals of all types, nursing homes, clinics, doctors' and dentists' offices and, in some localities, public health facilities. In all situations the LPN functions under supervision of a registered nurse and/or licensed physician. This supervision may be minimal in situations where the patient's condition is stable and not complex; or it may consist of continuous direction in situations requiring the knowledge and skills of the registered nurse or physician. In the latter situation, the LPN may function in an assisting role in order to avoid assuming responsibility beyond that for which the one-year program can prepare the individual.

Job requirements for the Licensed Practical Nurse include suitable personal characteristics, ability to adapt knowledge and understandings of nursing principles to a variety of situations, technical skills for performance of bedside nursing, appreciation for differences of people and for the worth of every individual, a desire to serve and help others, and readiness to conform to the requirements of nursing ethics and hospital policies.

PRACTICAL NURSE EDUCATION

CURRICULUM BY QUARTERS

Course Title	Hours Per Week			Quarter Hours
FIRST QUARTER	Class	Lab.	Clinic	Credit
Practical Nursing I	25	2	3	20
SECOND QUARTER				
Practical Nursing II	14	2	21	20
THIRD QUARTER				
Practical Nursing II	10	2	24	19
FOURTH QUARTER				
Practical Nursing II	10	2	24	19

PRACTICAL NURSE EDUCATION

PRACTICAL NURSING I

FIRST QUARTER

OBJECTIVES: To assist beginning students in practical nursing to acquire basic knowledge from nursing and from related areas of learning and to begin to develop the skills needed for safe and effective bedside car of patients whose health deviation has created a state of dependency in matters of daily living.

Course Material:

Nursing—History; introduction to patient care.

Health—Personal, physical and mental; family; community.

Basic Science—Body structure and function; bacteriology; basic nutrition.

Vocational Adjustments—Introduction to ethics and legal aspects of nursing.

Communications and Human Relations.

Classroom activities are planned to assist students in development of knowledge, understanding, appreciations, and attitudes basic to effective nursing of patients of all ages and backgrounds with nursing needs arising both from the individuality of the patient and from inability for self-care as a result of a health deviation. The student is encouraged to develop beginning skills in analysis of patient needs, both through classroom study of hypothetical patient situations and through planned patient experiences in the clinical environment. Beginning skills in nursing methods are developed through planned laboratory experiences, followed by related practice in actual patient care.

Clinical activities provide introduction to actual patient care through selected clinical assignments requiring application of current classroom and laboratory learnings.

Prerequisite: Admission requirements

PRACTICAL NURSING II

SECOND QUARTER

OBJECTIVES: To assist practical nursing students to acquire further knowledge and understanding and to develop further skills needed for rendering safe and effective nursing care to patients of all ages.

Course Material:

Medical—Surgical I

Oral Medications

Introduction to Maternity Nursing

Introduction to Nursing Sick Child

Classroom activities center around analysis of nursing needs as viewed in perspective with the needs arising from the individuality of the patient and from the illness condition. Related information is presented as it is relevant to the student's understanding of and ability to meet nursing needs of patients.

Clinical activities provide selected experiences in patient care in order for the student to develop skill in applying classroom learnings to a variety of patient situations.

Prerequisite: Practical Nursing I

PRACTICAL NURSING II

THIRD QUARTER

OBJECTIVES: To assist practical nursing students to acquire knowledge of common disease conditions and to develop beginning skills in rendering safe and effective nursing care to patients of all ages with specific needs arising from the illness and/or therapy.

Course Material:

Medical—Surgical I and II

Care of the Sick Child

Classroom activities center around analysis of nursing needs arising from the specific illness condition and the medical plan.

Clinical activities consist of guided experiences in nursing patients with conditions which illustrate classroom learnings.

Prerequisite: Second Quarter

PRACTICAL NURSING II

FOURTH QUARTER

OBJECTIVES: To assist advanced practical nursing students to acquire knowledge of needs of patients who are seriously ill, to develop beginning skills in assisting the registered nurse and/or physician in complex nursing situations, and to make the transition to the role of graduate practical nurse.

Course Material:

Medical—Surgical II and III

Drugs and Drug Administration (Injections)

Classroom activities center around the needs of seriously-ill patients of all ages, of labor patients, and of patients immediately following surgery.

Clinical activities consist of guided experiences in the care of seriously-ill patients, labor patients, and surgery patients, and is planned to parallel classroom learnings whenever possible.

Prerequisite: Third Quarter

RADIO AND TELEVISION SERVICING

Within recent years improved electronic techniques have provided expanded entertainment and educational facilities in the form of monochrome and color television, frequency-modulated radio, high-fidelity amplifiers and sterophonic-sound equipment. These developments require expanded knowledge and skill of the individual who would qualify as a competent and up-to-date serviceman.

This curriculum provides a training program which includes the basic knowledge and skills involved in the installation, maintenance and servicing of radio, television and sound-amplifier systems. A large portion of time is spent in the laboratory verifying electronic principles and developing servicing techniques.

A radio and television serviceman may be required to install, maintain and service amplitude-modulated and frequency-modulated home and auto radios, transistorized radios, monochrome and color television sets, intercommunication, public address and paging systems, high-fidelity and stereophonic amplifiers, record players and tape recorders.

His work will require meeting the public both in the repair shop and on service calls. A serviceman who establishes his own business will also need to know how to maintain business records and inventory.

RADIO AND TELEVISION SERVICING

CURRICULUM BY QUARTERS

	Hours Per Week		Quarter Hours
FIRST QUARTER	Class	Lab	Credit
ELC 1112—Direct and Alternating Current	5	13	9
ENG 1101—Reading Improvement	2	0	2
MAT 1101—Applied Mathematics	5	0	5
	12	13	16
SECOND QUARTER			
MAT 1102—Applied Mathematics	5	0	5
ENG 1102—Communication Skills	2	0	2
ELN 1122—Vacuum Tubes and Circuits	3	5	5
ELN 1123—Amplifier Systems	2	3	3
ELN 1126—Transistor Theory and Circuits	2	3	3
	14	11	18
THIRD QUARTER			
ELN 1125—Radio Receiver Servicing	2	6	4
PSY 1101—Human Relations	2	0	2
ELN 1127—Tele. Receiver Circuits & Servicing	4	6	6
ELN 1128—Transistor Theory and Circuits	2	3	3
	10	15	15
FOURTH QUARTER			
ELN 1131—Tele. Receiver Servicing (includes color)	8	15	13
BUS 1103—Small Business Management	2	0	2
	10	15	15

RADIO AND TELEVISION SERVICING

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Elc 1112—Direct and Alternating Current: A study of the structure of matter and the electron theory, the relationship between voltage, current and resistance in series, parallel and series-parallel circuits. Analysis of direct current circuits by Ohm's law and Kirchoff's law; sources of direct current potentials. Fundamental concepts of alternating current flow; a study of reactance, impedance, phase angle, power and resonance and alternating current circuit analysis.
Prerequisite: None

Eng 1101—Reading Improvement: Designed to improve the student's ability to read rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition and to train for comprehension in larger units.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

SECOND QUARTER

Mat 1102—Applied Mathematics: Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations; addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: Mat 1101

Eng 1102—Communication Skills: Designed to promote effective communication through correct language usage in speaking and writing.
Prerequisite: Eng 1101

Eln 1122—Vacuum Tubes and Circuits: An introduction to vacuum tubes and their development; the theory, characteristics and operation of vacuum diodes, semi-conductor diodes, rectifier circuits, filter circuits, triodes and simple voltage amplifier circuits.
Prerequisites: Elc 1112, Mat 1115

Eln 1123—Amplifier Systems: An introduction of commonly used servicing techniques as applied to monophonic and stereophonic high-fidelity amplifier systems and auxiliary equipment. The operation and servicing of inter-communication amplifiers and switching circuits will also be taught.
Prerequisites: Mat 1101, Elc 1112

Eln 1126—Transistor Theory and Circuits: Transistor theory, operation, characteristics and their application to audio and radio frequency amplifier and oscillator circuits.
Prerequisite: None

THIRD QUARTER

Eln 1125—Radio Receiver Servicing: Principles of radio reception and practices of servicing; included are block diagrams of radio receivers, servicing techniques of AM and FM receivers by resistance measurements, signal injection, voltage analysis, oscilloscope methods of locating faulty stages and components and the alignment of AM and FM receivers.
Prerequisites: Eln 1123, Eln 1122

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.
Prerequisite: None

Eln 1127—Television Receiver Circuits and Servicing: A study of principles of television receivers, alignment of radio and intermediate frequency amplifiers, adjustment of horizontal and vertical sweep circuits will be taught. Techniques of troubleshooting and repair of TV receivers with the proper use of associated test equipment will be stressed. Additional study of more specialized servicing techniques and oscilloscope waveform analysis will be used in the adjustment, troubleshooting and repair of the color television circuits.
Prerequisite: Eln 1126

Eln 1128—Transistor Theory and Circuits: A continuation of Eln 1126—Television Receiver Circuits and Servicing. Emphasis will be placed on techniques of trouble shooting and repair of TV receivers with the proper use of associated test equipment. This course will be primarily based upon application of principles previously studied.
Prerequisite: Eln 1126

FOURTH QUARTER

Eln 1131—Television Receiver Servicing (includes color): A broad servicing course including trouble shooting, radios, televisions, record players, sound systems, and other electronic communication devices. Major emphasis will be placed upon studying colored television principles and theories. The service and repair of colored television sets will be included for laboratory work.
Prerequisite: Eln 1128

Bus 1103—Small Business Management: An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations.
Prerequisite: None

WELDING

This curriculum was developed to fill the tremendous need for welders in North Carolina. The recently completed Manpower Survey shows quite clearly that many welders will be needed annually to fill present and projected vacancies in the State.

The content of this curriculum is designed to give students sound understanding of the principles, methods, techniques and skills essential for successful employment in the welding field and metals industry.

The field of welding offers a person prestige, security and a future of continuous employment with steady advancement. It offers employment in practically any industry: shipbuilding, automotive, aircraft, guided missiles, railroads, construction, pipe-fitting, production shop, job shop and many others.

Welders join metals by applying intense heat, and sometimes pressure, to melt the edges to form a permanent bond. Closely related to welding is "oxygen cutting." Of the more than 35 different ways of welding metals, arc, gas, and resistance welding are the three most important.

The principal duty of the welder using manual techniques is to control the melting by directing the heat from either an electric arc or gas welding torch, and to add filler metal where necessary to complete the joint. He should possess a great deal of manipulative skill with a knowledge of jigs, welding symbols, mathematics, basic metallurgy, and blueprint reading.

WELDING

FIRST QUARTER	Hours Per Week Class	Lab	Quarter Hours Credit
WLD 1120—Oxyacetylene Welding and Cutting	3	12	7
MAT 1101—Applied Mathematics	5	0	5
DFT 1104—Blueprint Reading	0	2	1
PHY 1101—Applied Science	3	0	3
	11	14	16
SECOND QUARTER			
WLD 1121—Arc Welding	3	12	7
MAT 1102—Applied Mathematics	3	0	3
DFT 1105—Blueprint Reading: Welding	0	2	1
PHY 1102—Applied Science	3	0	3
ENG 1101—Reading Improvement	2	0	2
	11	14	16
THIRD QUARTER			
WLD 1124—Pipe Welding	3	9	6
WLD 1123—Inert Gas Welding	0	3	1
DFT 1118—Pattern Development and Sketching	3	3	4
MEC 1115—Applied Metallurgy	2	0	2
ENG 1102—Communication Skills	2	0	2
	10	15	15
FOURTH QUARTER			
WLD 1122—Commercial and Industrial Practices	3	6	5
WLD 1125—Certification Practices	3	3	4
MEC 1112—Machine Shop Processes	0	3	1
DFT 1119—Layout and Pattern Drafting	2	3	1
PSY 1101—Human Relations	2	0	2
	10	15	13

WELDING

COURSE DESCRIPTIONS BY QUARTERS

FIRST QUARTER

Wld 1120—Oxacetylene Welding and Cutting: Introduction to the history of oxyacetylene welding, the principles of welding and cutting, nomenclature of the equipment, assembly of units. Welding procedures such as practice of puddling and carrying the puddle, running flat beads, butt welding in the flat, vertical and overhead position, brazing, hard and soft soldering. Safety procedures are stressed throughout the program of instruction in the use of tools and equipment. Students perform mechanical testing and inspection to determine quality of the welds.
Prerequisite: None

Mat 1101—Applied Mathematics: Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None

Dft 1104—Blueprint Reading: Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None

Phy 1101—Applied Science: An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles.
Prerequisite: None

SECOND QUARTER

Wld 1121—Arc Welding: The operation of AC transformers and DC motor generator arc welding sets. Studies are made of welding heats, polarities, and electrodes for use in joining various metal alloys by the arc welding process. After the student is capable of running beads, butt and fillet welds in all positions are made and tested in order that the student may detect his weaknesses in welding. Safety procedures are emphasized throughout the course in the use of tools and equipment.
Prerequisite: None

Mat 1102—Applied Mathematics: A study of basic concepts of mathematics in a direct relationship to Drafting. Transactions, decimals, powers and roots, percentages, ratio and proportions. An introduction to Trigonometry used in Drafting.
Prerequisite: Mat 1101

Dft 1105—Blueprint Reading: Welding: A thorough study of trade drawings in which welding procedures are indicated. Interpretation, use and application of welding symbols, abbreviations, and specifications.
Prerequisite: Dft 1104

Phy 1102—Applied Science: The second in a series of two courses of applied physical principles. Topics introduced in this course are heat and thermometry, and principles of force, motion, work, energy, and power.
Prerequisite: Phy 1101

Eng 1101—Reading Improvement: Designed to improve the student's ability to read rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition and to train for comprehension in larger units.
Prerequisite: None

THIRD QUARTER

Wld 1124—Pipe Welding: Designed to provide practice in the welding of pressure piping in the horizontal, vertical, and horizontal-fixed position using shielded metal arc welding processes according to Sections VIII and IX of the ASME code.
Prerequisite: Wld 1121

Wld 1123—Inert Gas Welding: Introduction and practical operations in the use of inert-gas-shield arc welding. A study will be made of the equipment, operation, safety and practice in the various positions. A thorough study of such topics as: principles of operation, shielding gases, filler rods, process variations and applications, manual and automatic welding.
Prerequisites: Wld 1120, Wld 1121

Dft 1118—Pattern Development and Sketching: Continued study of welding symbols; methods used in layout of sheet steel; sketching of projects, jigs and holding devices involved in welding. Special emphasis is placed on developing pipe and angle layouts by the use of patterns and templates.
Prerequisite: None

Mec 1115—Applied Metallurgy: Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals producing iron and steel, theory of alloys, shaping and form-

ing, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study.
Prerequisite: None

Eng 1102—Communication Skills: Designed to promote effective communication through correct language usage in speaking and writing.
Prerequisite: None

FOURTH QUARTER

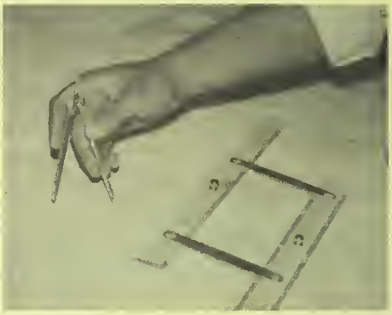
Wld 1122—Commercial and Industrial Practices: Designed to build skills through practices in simulated industrial processes and techniques: sketching and laying out on paper the size and shape description, listing the procedure steps necessary to build the product, and then actually following these directions to build the product. Emphasis is placed on maintenance, repairing worn or broken parts by special welding applications, field welding and nondestructive tests and inspection.
Prerequisites: Wld 1120, Wld 1121

Wld 1125—Certification Practices: This course involves practice in welding the various materials to meet certification standards. The student uses various tests including the guided bend and the tensile strength tests to check the quality of his work. Emphasis is placed on attaining skill in producing quality welds.
Prerequisites: Wld 1120, Wld 1121, Wld 1123, Wld 1124

Mec 1112—Machine Shop Processes: To acquaint the student with the procedures of layout work and the correct use of hand and machine tools. Experiences in the basic fundamentals of drill press and the lathe operation; hand grinding of drill bits and lathe tools; set-up work applied to the grade.
Prerequisite: None

Dft 1119—Layout and Pattern Drafting: Students will receive practical experience at laying out metal pattern designs which may be fabricated through one of the various welding techniques. These will be layed out and scaled to various sizes for working blueprints and later scaled to full size on the actual metal to be processed.
Prerequisite: Dft 1118

Psy 1101—Human Relations: A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation.
Prerequisite: None



EXTENSION & GENERAL ADULT EDUCATION DIVISION

EXTENSION DIVISION

The Cape Fear Technical Institute provides training in numerous areas through its Extension programs. Extension classes are held both at the school and at various locations throughout New Hanover, Brunswick and Pender Counties. These classes are designed to prepare individuals for employment or to upgrade workers already employed.

The extension department also serves area industries and public agencies by providing training for their employees. Training under this division of the Institute can be offered at any time a need for such training is established. Full details can be obtained by contacting the Director of Extension programs at the school.

Admission Requirements

Generally speaking any individual who is 18 years of age or whose high school class has graduated is eligible for admission to extension classes; applicants are usually admitted on the first come, first served basis. Some classes may have specific admission requirements, in such cases the Director of Extension programs will inform applicants of these requirements.

Expenses

Many of the extension classes are offered without charge to the students; in other cases a small fee is charged to cover the cost of instructional supplies. Any charges should be paid at the first class session.

Certificates

The Extension Division issues certificates to those who complete a course satisfactorily.

EXAMPLES OF EXTENSION PROGRAMS OFFERED

Air Conditioning & Refrigeration
Aircraft Assembly
Auto Mechanics
Auto Electricity
Basic Electronics
Blueprint Reading
Commercial Fishing
Crab Processing
Electricity
Electronic Circuits
Furniture Upholstery
Instrumentation
Janitorial Maintenance
Loom Fixing
Machine Shop Practice
Marine Diesel Mechanics
Metal Burning
Net-Making & Mending
Power Sewing
Slide Rule
Small Engine Repair
Supervisory Development Courses
Tailoring
Tourist Serving Training
Waitress Training

AGRICULTURAL

Farm Records
Fertilizers and Lime
Pesticides
Welding for Farmers
Ornamental Horticulture

BUSINESS

Typing
Bookkeeping
Shorthand

CONSTRUCTION

Bricklaying
Carpentry
Housewiring
Plumbing

PUBLIC AGENCIES

Fire Training
Fire Officer Training
Fire First Aid
Nurses' Aide
Orderlies Training
Police Training
Teacher Aides

SUPERVISORY DEVELOPMENT

The Art of Motivating People
Effective Writing
Effective Speaking
Human Relations
Industrial First Aid
Effective Communications
Job Methods
Industrial Safety & Accident Prevention
Job Analysis Training
Work Measurement

This list, of course, is in no way comprehensive, but is offered as a general sample of extension-type courses. Four further information on this division contact the Director of Extension Programs.

GENERAL ADULT EDUCATION

The General Adult Education division of the Cape Fear Technical Institute is primarily concerned with raising the educational level of adults and providing cultural improvement courses. The Institute is prepared to provide training at all educational levels from grade one (learning to read and write) up through high school equivalency. This training is provided through organized classes and through the school's Learning Laboratory.

HIGH SCHOOL EQUIVALENCY CERTIFICATE

The State of North Carolina, through the State Board of Education permits adults (19 years of age) to take the General Educational Development Tests, (generally referred to as "the High School Equivalency Examination") at test centers throughout the State. Persons who make satisfactory scores on all five sections of the test are issued the High School Equivalency Certificate by the State Board of Education. This certificate is recognized by most industries, schools, and government agencies as meeting their requirement for a high school education. Cape Fear Technical Institute is a G.E.D. test center. The test is generally given once each month; applications for the tests may be obtained from the Institute or from the office of any school superintendent.

The Institute provides training in the five areas covered by the examination both through organized classes and the Learning Laboratory.

ORGANIZED CLASSES

Classes in adult education are organized as follows:

Basic Education I — For those adults who have completed less than four grades of formal education.

Basic Education II — For those adults who stopped school in grades 5-8 or who have completed Basic Education I.

Secondary I — For those adults who stopped school in grades 9-10 or who have completed Basic Education II.

Secondary II — For those adults who stopped school in grades 11-12 or who have completed Secondary I.

The school's Learning Laboratory provides training for those who are not able to attend the organized classes. See the Learning Laboratory Section (pages 124-125) for full details.

In addition to the organized classes at the basic and secondary education levels, the General Adult Division offers a large variety of courses both at the school and throughout the area it serves. The type and frequency of these offerings are determined by the demand and interest in a given area of study. A sampling of courses under this heading would include:

Law for the Layman

Homemaking — Sewing and Food Preparation

Driver Education for Adults

Remedial Mathematics for the Prospective College Student

Remedial English for the Prospective College Student

Modern Math for Parents

Conversational French

Conversational Spanish

Speed Reading and Reading Improvement

Creative Art

Creative Writing

Public Speaking

Citizenship Studies for Naturalization

Interior Decorating for Homeowners

First Aid

Auto Mechanics for Car Owners

Ceramic Arts and Crafts

Additional courses are offered as the demand becomes evident. Details of these and other courses may be obtained from the Director of General Adult Education.

Admission Requirements

Any adult who has a desire to raise his or her educational level and who is able to benefit from a course may enroll in the general adult classes.

Expenses

There is no charge for the Basic Education and only a small fee to cover the cost of instructional materials in the Secondary I and II classes. Charges for other general adult classes are determined by the length of the course and instructional materials needed.

LEARNING LABORATORY

The Cape Fear Technical Institute Learning Lab — A Brief Summary of What It Is

The Learning Laboratory program at the Cape Fear Technical Institute is designed to provide study opportunities in practically any field that might be of interest to residents of the New Hanover, Pender or Brunswick County area.

Persons interested in participating in the Learning Laboratory, after an initial interview, are provided study materials starting at a point in keeping with their achievement level and are able to progress from there. Students may elect study times adjusted to their convenience and schedules.

A "Learning Laboratory" is essentially an individual study situation, in which any person eighteen years of age or older may undertake most any level of Reading, English, Math, Social Studies, or Science that he desires. All of the material used in the lab is programmed; therefore, there is no need for a classroom teacher. In fact, efforts have been made to remove all semblances of a classroom from the Learning Lab.

Programmed material is designed in such a manner as to aid the student in learning information in small sequences called "Frames." Each frame requires an immediate response, and each response is immediately checked. If the student fails to learn, or learns incorrectly, the program makes the correction or re-teaches. In this manner the student progresses at his own rate; he neither has to wait for others to catch up nor slow down to someone else's rate.

The coordinator, the person in charge of the learning lab, has the responsibility of locating the level at which a student can proceed to learn by himself, of formulating the sequence of programs the student will undertake to achieve his desired goal, and of administering the tests that will assure the student that he is approaching his goal.

Because there are no classes in the learning lab, there is no need for anyone to wait until the new quarter to enroll. Each student sets his own work sessions and attends the lab as many days each week and as many hours each day as he thinks he can attend regularly. There are no fees, and any adult can take as many courses as fit his needs.

The majority of students presently enrolled in learning labs are seeking to prepare themselves for the high school equivalency ex-

amination or to gain educational improvement of their own choosing. Some, however, are enrolled to upgrade themselves for a possible job promotion; while others are using the program for reinforcement in a technical institute curriculum or in their college work.

Admission Requirements for Learning Laboratory

Any adult over 18 years of age who has a desire to raise his or her educational level and who is able to benefit from study in the Learning Laboratory may enroll.

Expenses

There is no charge for study in the Learning Laboratory.

Courses

Some of the fields in the Learning Lab are: Mathematics, English, Foreign Languages, Reading Improvement, Social Sciences, Natural Sciences, Nursing, Electronics, and Business. Courses are added almost daily. There are over 250 different courses offered now.

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